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ABSTRACT

The study involving four teachers, two tutors, and ten preschool hearing impaired children investigated both the linguistic relationship between adult and child utterances and the teaching strategies involved in the process of interacting. A literature review focuses on three major areas--language interaction between adults and normally hearing children, studies of communication between parents and young hearing impaired children, and studies of relevant research regarding language learning in deaf children. The study involved videotaped sessions with the child in regular preschool activities and in a training session with the investigator, videotaped sessions of the child and teacher playing and discussing a story and the child and the speech/language tutor playing and discussing a story, and a session in the child's home in which the parent(s) was interviewed and audiorecorded. Among conclusions reached from findings were that the hearing impaired children were dependent upon the form of the adult input message for formulating their own messages to an extent not found with normally hearing children; that the responding to nonquestions with other imitations was a difficult task for the hearing impaired children; and that discourse development appeared to be interdependent rather than dependent upon a particular adult reaction or strategy with linguistic and nonlinguistic context influencing both the adult and the child in the dyadic exchange. Included in the appended materials are profiles of individual children, the six sequence picture story, instructions to teachers and tutors, procedures for transcribing videorecorded data, discourse analysis of child utterances and adult reactions, and a sample parental permission form. (SB)

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DIRECTED STUDENT RESEARCH

FINAL REPORT

443AH70025

ADULT-CHILD INTERACTIONS AND THE LANGUAGE OF HEARING IMPAIRED CHILDREN IN A PRESCHOOL SETTING

By

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EC 142401

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Chapter I

THE PROBLEM

Introduction

It is universally recognized that deafness has a devastating effect on the individual's ability to attain competence in his native language. Long before professionals in other areas of education were attempting to reveal the mysteries of language, educators and investigators in the field of deafness were concerned with appropriate procedures for its development (Bell, 1883; Buell, 1912; Clerc, 1851, cited in Schmitt, 1966; Fitzgerald, 1918; Wing, 1887), its assessment (Pintner, 1918; Thompson, 1936), and its comparison to the language of hearing children (Heider and Heider, 1941). The Bibliography on Deafness (Fellendorf, 1977) references 250 articles, all written before 1940, pertaining to the development of oral and/or written language of deaf children. This early concern, which has continued to be one of the major priorities in the field, has led to numerous contributions in the form of procedures and materials that aid in language learning for deaf children. Nelson (1949) and Schmitt (1966) have extensively reviewed the evolution of methods of language instruction for the deaf.

The early methods and devices such as the Wing Symbols (1887) and the Fitzgerald Key (1926) reflected both the grammatical formalism of their time and the insights or intuitions of their developers. The Subcommittee on Human Communication and its Disorders (Carhart, 1970) reported:

> The techniques now in use for developing the ability of the deaf to understand others and to express themselves to others have reached high levels of competence, but these techniques have evolved primarily from the empirical experience of teachers. (p. 77)

Similarly Blackwell, Engen, Fischgrund, and Zarcadoolas (1978) in the introduction to their language curriculum, advised:

> It is important to recognize the many teachers who have been successful in the classroom and who have intuitively developed successful language teaching procedures. Many of these approaches, however, are often directly related to the personality or intuitions of these capable and successful teachers and, as such, have not been widely transferable to other classroom situations. (p. 1)

A different view of teacher or adult intuitions has been expressed by Lahey (1978) in her discussion of disruptions in the development of language:

> It is now apparent that the intuitions that adults may have about the relative simplicity or importance of different words or syntactic structures do not agree with the kinds of words and sentence relations that young normal children first use when they learn to talk. . . . It is certainly conceivable that the use of adult intuitions to prescribe a sequence of language goals may have accounted, in part, for the fact that spontaneous and creative language use often is not reported as a result of intervention programs. (p. 257)

There is evidence to support the above statements. Lowenbraun (1969), in a study of the oral language of 41 deaf children from six to 14 years of age, concluded that traditional methods of teaching deaf children do not approximate normal developmental processes and may even preclude the attainment of adult linguistic competence.

As Chomsky's influence was felt during the 1960's, the early diary studies of both language development (Leopold, 1939; Lewis, 1951), and conceptual development (Piaget, 1954) were rediscovered by researchers who concurrently raised new questions and developed

new techniques for the study of language in children (Bloom, 1970; Brown, 1973). Educators and investigators, who had continued to seek innovative and improved methods of language instruction for deaf children, were influenced by the growing body of knowledge concerning normal language development. Linguists began to be involved in conferences and institutes in the field of deafness (McNeill, 1966; Mulholland, 1965) and procedures for applying research to the classroom were considered. As a result of this interest, a plethora of materials and methods for assessing and teaching language have appeared in print during the last ten years.

Lahey's (1978) conclusion:

> The more appropriate hypotheses to use in planning the goals of an intervention program ought to come from the information that is available about sequential development in normal language acquisition. (p. 257)

seems to have been accepted as indeed reasonable. In the language curriculum of the Clarke School for the Deaf (1972) for example, the philosophy of the school is based on:

> An understanding of the normal, developmental growth of language is essential for all people working with the child, since the acquisition of language skills should follow the same steps for the deaf child as for the hearing one. (p. 1)

There are those who argue that strategies for describing atypical or deviant linguistic rule performance must be built into any system of either analysis or intervention (Kretschmer and Kretschmer, 1978). Such atypical performance has been identified by Quigley and associates (See for example, 1974, 1976, 1977) but the reasons for its existence have not been empirically determined. Whether this deviant performance is due to the effects of hearing impairment on cognitive development or

to the influence of American Sign Language, either as a language or as an alternative symbol system, has not been determined. Kretschmer and Kretschmer (1978) suggested that a combination of the above factors, in addition to a general delay in development due to a lack of linguistic/cognitive experience, leads to a continued dearth of linguistic proficiency in deaf persons.

Another factor contributing to language development in deaf children concerns the effect of the teacher on the language learning process. Methods based on intuitions and experiences of teachers have been previously cited as powerful when in the hands of capable teachers but not easily transferable to other classroom situations (Blackwell et al. 1978) and as contra-indicated when used to prescribe a sequence of language goals (Lahey, 1978). Concerning the development of language, Blackwell and associates (1978) concluded that "the dynamic process of interaction is as important as the product" (p. 1). That language exposure is necessary for the language learning task has not been disputed even for normally hearing children. For the child who is deaf the interaction process is crucial:

> Normally hearing children can acquire much of their auditory-verbal experience indirectly and at a considerable distance from speakers. In contrast, most hearing-impaired children have but a limited auditory range, and must be spoken to directly if they are to learn verbally. (Ling and Ling, 1978, p. 129)

Concomitantly, deaf children who are learning language primarily or simultaneously through the visual mode also require more direct interaction. Language to be "overseen" requires a degree of proximity and attention that does not seem to be true for language to be "overheard". The importance of indirect environmental language while

generally disputed in the literature remains to be determined.

While studies examining strategies with hearing impaired children have focused on interaction patterns in the classroom (Craig and Collins, 1970a and b; Lawson, 1978; Wolff, 1977) and teacher response styles (Erber and Greer, 1973; Scroggs, 1975) as well as on the effect of teacher strategies on cognitive levels (Buckler, 1978; Wolff, 1977) and achievement (Holdt, 1976), the relationship between teaching strategies and the individual learner has not been extensively explored. There is evidence that teachers develop idiosyncratic styles which do not change as a result of varying learning styles within groups of deaf children (Erber and Greer, 1973; Buckler, 1978). Since hearing children display variation in their learning strategies (Bloom, 1970; Bloom, Hood, and Lightbown, 1974; Bloom, Lightbown, and Hood, 1975; Nelson, 1973), it would be reasonable to assume that hearing impaired children also vary in their approaches to learning. If the adult's teaching strategy conflicts with the child's learning strategy or fails to change as the child changes, the effect on language learning might be critical.

It has been well documented that "adults systematically modify the speech they address to young children" (Clark and Clark, 1977, p. 239). A number of these modifications such as modeling, expanding, and imitation have consequently been recommended for classroom use by teachers of deaf children (Scroggs, 1975) and for parents of hearing impaired children (Northcott, 1977; Simmons-Martin, 1976). The research literature offers conflicting evidence as to the efficacy of these modifications with hearing children, and it has yet to be proven whether they are effective as used with deaf children.

Since children learn uses of language as well as linguistic forms and semantics of words and sentences (Bloom, 1978a), it is essential that deaf children encounter and interact with language in its interrelated triad of form, content, and use. Studies that show deaf children to be deficient in pragmatic performance (Gorrell, 1971 cited in Streng, Kretschmer, and Kretschmer, 1978; Hoemann, 1972) indicate that "interactions to develop language do not necessarily develop comminication competence" (Streng et al. 1978, p. 92). The development of discourse is dependent on a speaker's abilities to represent and exchange ideas with another listener/speaker. Bloom, Rocissano, and Hood (1976) described three types of interaction studies that are related to the development of discourse in children: form or the model of adult input; conventions of conversation such as initiating and turn-taking; and formal and semantic interactions between adult and child speech or the ability of the child to use the information in the preceding adult utterance to form his own utterance. Equally important in the development of language for discourse or communication is the succeeding adult utterance both in its relationship to the preceding child utterance and to its effect on subsequent child responses. Buckler (1978), as a result of her study of teacher strategies, suggested that research is needed on the effects of teacher reacting, adult utterances following child responses, on subsequent responses of hearing impaired children.

To summarize, the interaction process is crucial for language development in deaf children regardless of mode of communication. Previous intuitions of capable teachers concerning interactive strategies may have been effective but remain to be empirically determined through

application to other teachers and other classrooms. Concomitantly the efficacy of applying strategies used by caregivers of children who are learning language normally to interactions between teachers or parents and deaf children needs to be determined. Finally, teaching strategies for the development of discourse in deaf children are as yet unspecified.

Statement of the Problem

Since neither optimal language input nor effective interaction strategies have been specified for the development of communication competence in deaf preschool children, the present study was proposed to investigate both the linguistic relationship between adult and child utterances and the teaching strategies involved in the process of interacting.

Research Questions

It was the objective of the study to analyze the relationship betwen utterances of teachers and tutors and the utterances of preschool hearing impaired children in situations where only one adult and one child were interacting. The analysis was designed to answer the following questions:

1. What is the linguistic relationship between utterances of young hearing impaired children and utterances of their teachers and tutors during discourse?

2. Do the interaction strategies employed by teachers and tutors change within and/or across discourse situations with young hearing impaired children?

Definition of Terms

The following terms are defined as they relate to their use throughout the study:

Adult elicitation - any adult utterance which immediately precedes a child utterance.

Adult reaction - any utterance by a teacher or tutor that follows and is adjacent to a child response.

Child response - any utterance by a child that follows and is adjacent to an adult elicitation.

Child subsequent response - any utterance of a child that follows and is adjacent to an adult reaction.

Discourse analysis - a procedure for analyzing the relationships among utterances of two speakers. The system of analysis used is based on Bloom, Rocissano, and Hood (1976) with adaptations for adult utterances and for the hearing impaired population.

Discourse event - utterances of two speakers forming a cycle that begins with an adult elicitation followed by a child response which is followed by an adult reaction or no reaction. If there is an adult reaction, there may or may not be a child subsequent response (CSR). The adult reaction, if followed by a CSR is then recycled into the next discourse event where it becomes the adult elicitation and the CSR becomes the child response. A discourse event may also begin with a nonadjacent child utterance. (see Figure 1)

Hearing impaired - a generic term indicating a hearing disability which may range in severity from mild to profound; it includes the subsets of deaf and hard of hearing (Frisina, 1975, p. 25). In this study the term hearing impaired is used interchangeably with the term deaf.

Mean length of utterance (MLU) - ratio of number of separable morphemes to number of utterances used as an index of linguistic maturity. (Adapted from Brown, 1973, p. 54)

Utterance - a unit of one or more words or approximation of word(s) which is specified by juncture (a perceived pause) or terminated by rising or falling intonation.

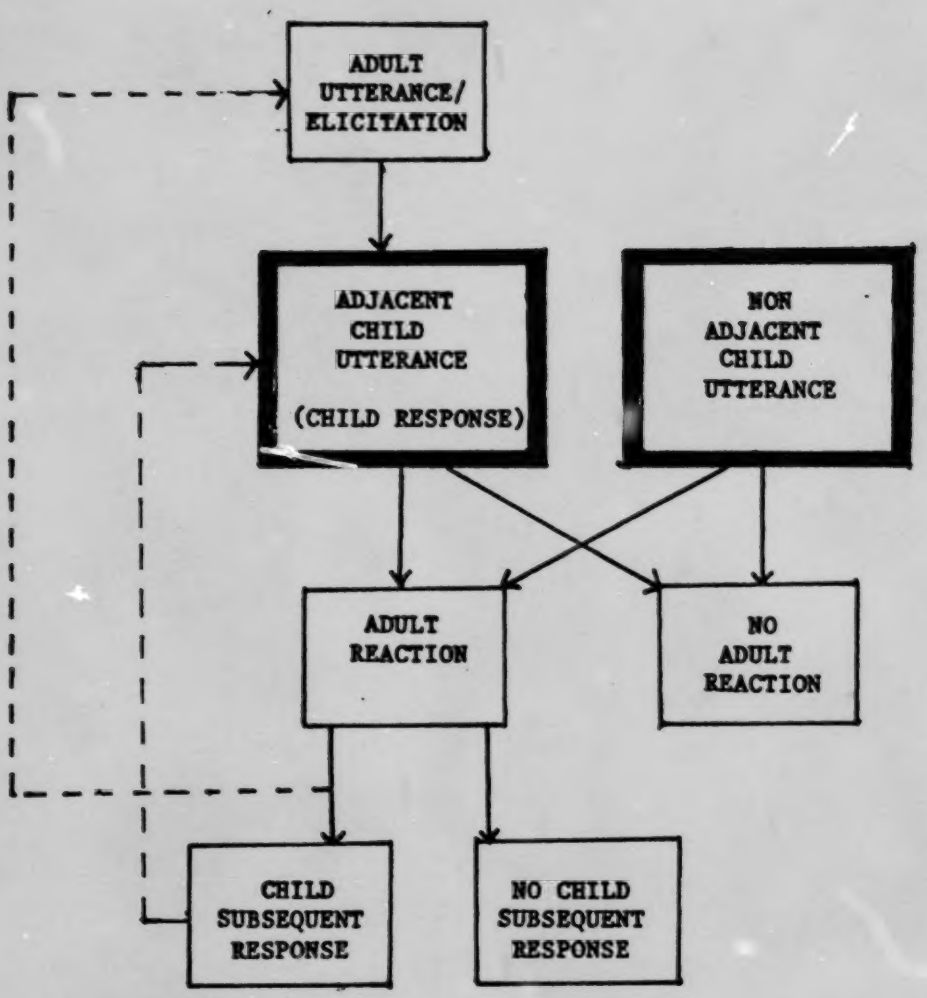

FIGURE 1. DISCOURSE PARADIGM

Teaching strategy/interaction strategy - a behavior pattern which reflects the adult's perception of the learning/teaching task involved in communication and the manner in which the task is accomplished. (adapted from Buckler, 1978)

Limitations of the Study

The present study was limited in the selection of subjects. The supervisor of the preschool department made the selection based on his interpretation of their language development and on the likelihood of parental cooperation. After parents gave their permission, the children's teachers were then asked to participate; therefore, there was not an equivalent number of children for each teacher. At the time of the collection of data, this was unavoidable.

The study is also limited in terms of representativeness. The four teachers, two tutors, and ten hearing impaired children were from a single department in an oral school for the deaf in New York City. Four of the six adults received masters degrees from the same graduate program also located in New York City. The children came from different backgrounds and while representative of the other children in their school, they might not have been representative of populations from other schools. Also the mode of communication was auditory-oral and the interaction strategies and relationships among utterances might not be the same in educational settings where children and adults use other communication modes.

Chapter II

REVIEW OF THE RELEVANT LITERATURE

The review of the literature focuses on three major areas: (1) language interaction between adults and normally hearing children; (2) studies of communication interaction between parents and young hearing impaired children and between teachers and hearing impaired children; and (3) studies of relevant research regarding language learning in deaf children.

The child is recognized as an active participant in the language learning process with language development seen as:

> the result of the child's interaction with the context - an active process whereby the relation bewteen linguistic categories (form) and nonlinguistic categories (content and use) are learned. (Bloom and Lahey, 1978, p. 266)

One way in which this integration of form, content or meaning, and use occurs is through interaction with adults. Studies concerning communication interactions have focused on three areas that are relevant to the development of discourse (Bloom, Rocissano, and Hood, 1976). Most investigators have studied the form of adult input or the model for language learning. Others have studied pragmatic aspects including communicative intentions and conversational conventions, and others have focused on those aspects of form and meaning that are shared in successive utterances of adults and children.

Language Interaction Between Adults and Normally Hearing Children

The Adult Model

Results of investigation of linguistic input to children indicate that the model available to the young child is highly suited for language learning. Adult language addressed to children is grammatically correct, has a limited variety of syntactic constructions (Brown and Hanlon, 1970; Pfuderer, 1969; Snow, 1972) with low mean length of utterance (Cross, 1977; Nelson, 1973; Newport, Gleitman, and Gleitman, 1977; Seitz and Stewart, 1975), low type-token ratio for vocabulary (Broen, 1972), and includes limited semantic relations (Snow, 1977). Adults speak slowly to children, pause between utterances (Broen, 1972), and with very young children tend to use speech that is high pitched with exaggerated intonation and stress (Garnica, 1977). In addition, adult-child speech is closely related to context and is often described as relating to the "here and now" (Bloom, 1970; Brown, Cazden, and Bellugi, 1969; Ling and Ling, 1974; Nelson, 1973; and others).

Adults not only modify their speech when talking to young children but they appear to be sensitive to language growth in children as reflected in changes in their modifications when talking to children of different ages and linguistic abilities (Broen, 1972; Garnica, 1977; Moerk, 1974, 1975; Nelson, 1973; Phillips, 1973). Functions of speech to children also change with language growth. Gleason and Weintraub (1978) and Snow (1972) described speech to young children as a teaching language composed of language lessons. At about age four adult speech becomes a "language of socialization . . . filled with explicit

instructions about the world rather than with lessons about language" (Gleason and Weintraub, 1978, p. 205).

Interactive and Learning Strategies

Although studies of early language development have been impressive in their findings of regularities in child language, Nelson's (1973) statement that "there is no one way to learn language" (p. 114) has been substantiated by a number of studies. In a longitudinal study of 18 children between one and two years of age, Nelson identified individual differences in language acquisition. Based on early vocabulary, some children appeared to be learning an object language and were termed "referential" and others a social interaction language described as "expressive" (p. 22). Bloom (1978_a) pointed out the problems in the interpretation of such findings since there was no indication of productivity or frequency of use. Furthermore, referential words include both the substantive and relational words which make up the form/content categories of all children's later development. Nelson identified a particular parental interactive strategy, nondirective-accepting as opposed to directive-rejecting, as facilitating children's language acquisition. She emphasized the importance of the match of the parental strategy with the child's cognitive structure for developing language.

Bloom (1970), in a longitudinal study of the language development of three children, found differences in constituent combinations in children when mean length of utterance (MLU) was less than 1.5. Two children used subject - verb, verb - complement, and subject - complement, while another child used only verb - complement structures. In a

subsequent study of the three children plus another child (Bloom, Lightbown, and Hood, 1975) all four children were using the full constituent structure when MLU approached 2.0. Also identified were different strategies in the children's use of either nouns or pronouns in relation to verbs (Bloom, 1970; Bloom, Lightbown, and Hood, 1975). Two children used nominal reference while the other two children used pronominal reference. The former used a variety of nouns with verbs to express the grammatical categories of agent, possessor, place, and affected object and the latter used a constant form, that is, pronouns such as "I", "my", "this", "there", and "it", with verbs to encode the same notions. When MLU reached 2.5, all children were similar in their use of nouns and pronouns, with a shift from their previous nominal or pronominal strategy to one in which pronouns were used predominantly to encode agents and nouns to encode objects. Identification of different learning strategies has implications for those planning language intervention programs. It might be expected that a pronominal strategy would be easier to learn when input is less than ideal; however, in a study by Schiff (1976, 1979) of the language development of five hearing children of deaf parents, a predominant strategy was present for only two of the children when MLU was less than 2.0 and that strategy was predominantly nominal. Two of the children, who were reported as developing language slowly, used pronouns to encode agents and nouns to encode objects from the beginning. Tamari (1978) who studied language development in four mentally retarded children found that two of the children used predominantly nominal and two children predominantly pronominal strategies. As MLU passed 2.0 all four children used both

nominal and pronominal forms; however, a shift to using pronouns to encode agents and nouns to encode objects was not evidenced by the end of the study when MLU was 2.3. Conclusions reached concerned whether a lack of a predominant strategy (Schiff) or a shift (Tamari) might be related to a slower rate of development.

An interactive process whereby adults and children repeat each other's messages was identified by Brown and Bellugi (1964). Typically children imitate part of the adult's preceding utterance, and adults repeat and expand, add to, children's utterances. Brown and Bellugi found, in a longitudinal study of the language development of two children (a third child was added later), that adults responded to the child's speech with expansions 30% of the time. The process of expanding they described as retaining "the words given in the order given, and adding those functors that will result in a well-formed simple sentence that is appropriate to the circumstances" (p. 147).

Lower incidences of expanding have been found in other studies, possibly due to varying operational definitions. Ling and Ling (1974) observed 48 children age one to 36 months interacting with their mothers. Among children from 14 to 36 months of age whose encoding abilities were described as ranging from single words to "connected patterns" (p. 155), only 2.4% of the mother's responses were expansions. In the study by Nelson (1973), 6% of the utterances of mothers of two year olds were imitations or expansions. The investigator pointed out that this included all utterances of the mothers, not just responses to child speech, and she posited that "mothers may expand only when the child has begun to make relatively complex statements that need further interpretation" (p. 86). Seitz and Stewart's (1975) findings tend to

disprove the above statement, however. In a study of 18 mother-child pairs, 8.9% of the mothers' utterances to the younger children, mean age 23 months, were imitations or modifications. With the older children, mean age 56 months, 2.9% were imitations or modifications. Modifications included Brown and Bellugi's (1964) expansions as well as contradictions, reductions, and expansions which did not provide a complete sentence. Mothers' use of expansions was positively correlated with the children's use of imitations. Mothers seemed to use the child's imitations as a measure of linguistic proficiency and possibly used expansions to provide the child with syntactic information the imitations lacked. Slobin (1968) pointed out that when two children in Brown and Bellugi's (1964) study imitated the parent's expansions, the children selected something from the expansion and added it to their utterance 50% of the time.

Evidently adults may respond in a different way to children's more complex utterances. DePaulo and Bonvillian (1978), in a review of adult modifications, pointed out that a strict adherence to Brown and Bellugi's (1964) definition for expansions is not useful since parents often add content words as well as function words to the child's utterance. The use of extensions is a technique in which the adult responds to the meaning of the child's utterance and is defined as:

> An adult verbal response which is contingent on the child's previous utterance, and which presupposes a particular expansion but then builds out from it along some dimension of meaning. . .
> Example: child's utterance: "Dog bark."
> adult's utterance: "Yes, and the kitty is running after him." (Cazden, 1972, p. 201)

The use of semantic extensions was found by Cross (1977) in a study of 16 mothers and their children of 19 to 32 months. Expansions

or imitations comprised 20.5% of the mother's utterances while 34.7% were described as extensions. Therefore, more than 55% of the adult's utterances were either semantically or syntactically contingent on the children's utterances.

It is evident that in much of adult-child discourse, the adult responds to the form and content of the child's message through repetition, either exact, reduced, or modified in some other way. Slobin (1968) and Brown and Bellugi (1964) suggested that adults often repeat children's utterances as a verification check. Keenan (1977) termed the use of verification or communication checks as a means of turning "an utterance into shared knowledge" (p. 135) for furthering discourse. Rees (1975) suggested that mothers and young children communicate in the same way, the child imitates the mother and therefore, the mother imitates the child not as a verification check but "to indicate that the message has been received. It means 'I am listening'" (p. 348). Furthermore, she implied that imitation plays a reciprocal role in the development of the communicative process.

Another technique was described by Nelson, Carskaddon, and Bonvillian (1973) as recast sentences in which the semantic reference of the child's complete sentence was repeated in a different sentence type, i.e., a child's statement might be changed in the succeeding adult utterance to a question. Other techniques described in the literature include prodding, providing a clue to the child that he is to repeat what the adult has said, and modeling, providing well-formed sentences as a model for the child without either repeating the child or actively eliciting an imitation from the child.

All of the above mentioned techniques have been identified as interactive or teaching strategies that are used by adults in the process of communication with young children. Whether they are effective or even necessary for language learning has yet to be determined. Children do learn about the interrelationship of linguistic features (form) and nonlinguistic aspects (content and use) necessary for language learning. One way in which this is done is through interactions with adults. The process of discourse provides a setting that is conducive to induction of the many rules of language. Discussion of the role of imitation in the development of discourse is relevant to this study.

The Role of Imitation

That children imitate has been noted in the literature for many years (Guillaume, 1968; Leopold, 1949; Lewis, 1951; and others). The functions of imitation and its relative importance for language learning however, have been disputed. Ervin (1964) concluded, after a comparison of spontaneous utterances and imitations of five children, that imitation is not grammatically progressive but conceded that it might aid in vocabulary or phonetic acquisition. She found that the children imitated the most recent and most emphasized words while keeping the word order of the adult utterance. In agreement with Ervin's findings, Shipley, Smith, and Gleitman (1969) noted that children often imitated a command containing nonsense words and concluded that imitation may aid in vocabulary learning. Others have observed that children imitate structures more advanced than those in their spontaneous utterances (Bloom, 1970; Slobin, 1968).

In order to help clarify some of the issues concerning imitation, Bloom, Hood, and Lightbown (1974) compared the spontaneous and imitative language of six children. An utterance was considered to be an imitation if it had not been elicited and it did not change the preceding utterance except for omissions. Results showed that two of the children rarely imitated. For those children who did imitate, its function appeared to be lexical for one child and for learning the semantic-syntactic relations among words for three children. The children imitated words and structures which they were in the process of learning not those which they did not use at all or which appeared frequently in their spontaneous language. The investigators concluded that imitation is evidence that the child actively processes the adult model and that for the child who is an imitator, imitation is developmentally progressive.

A study by Ramer (1976) was addressed to the issue of the role of imitation in facilitating language development. She studied seven children when MLU was 1.0 until MLU reached 2.0. The definition of Bloom et al. (1974) was used with an added category of elicited imitation which was described as rote routines. All imitations were categorized according to a set of six functions, two of which reflected semantic functions, two syntactic, and the remaining two, communicative functions. Ramer found that not all children imitated to the same extent; those children who imitated extensively did not just imitate more frequently, rather their imitations served several functions. She concluded that imitation was not random, that when used, it occurred with forms that were in the process of being learned.

Additionally, Ramer posited that imitation is one strategy that may be employed by children but that "cannot be considered requisite for language acquisition in all children" (p. 75).

Children's use of imitation during the single word period of development was the focus of a study by Nicolich and Raph (1978). They found that imitation was used or not used by all five children at different times in their development. While there were large individual differences in the amount of imitation, there was similarity in the patterns of imitation which was related to the level of symbolic maturity as observed in play. The investigators concluded that imitation is developmentally progressive as evidenced by the children's subsequent spontaneous use of words which had previously been imitated.

In order to determine the relationship between imitation and the uses of language, Folger and Chapman (1978) studied the imitations of six children as functions of intent of parental utterances. Adult utterances were classified according to ten speech-act or pragmatic categories. The investigators found, in agreement with Bloom et al. (1974) and Ramer (1976), that not all children were imitators. Results also corroborated Slobin's (1968) observations that children tend to imitate adult expansions. Subjects in the Folger and Chapman study imitated nearly one-third of the adult's expansions regardless of pragmatic function. When imitations were analyzed in relation to pragmatic function, it was found that the children selectively imitated depending on pragmatic differences among speech acts. The investigators concluded that children imitate when given the pragmatic cues to do so and not when they are at a loss as to how to respond as had been

suggested by Rees (1975). Folger and Chapman suggested an answer to Bloom et al. (1974) concerning why some children do not seem to imitate:

> First, given the relatively low percentages of imitation for requests for action and statements, parents whose speech is highly directive and subjective may prompt fewer imitative responses from imitative children. Second, in the light of the high imitative response rate to expansions and the correlation between parental and child imitators, an imitative child may be one whoe parents imitate her. (p. 37)

The problem of why some children imitate and some do not was addressed by Keenan (1977). She suggested that communicative intentions of the child be considered and reported that utterances that repeat form do not necessarily repeat meaning. Keenan discussed ten pragmatic functions of child repetitions, only one of which was intended as an imitation. She posited that Bloom's et al. (1974) imitators may not be imitating and concluded that children use different formal devices to do similar communicative work.

The question of what children do when they do not imitate was posed in a study of the development of discourse by Bloom, Rocissano, and Hood (1976). Utterances of four children were studied at three stages of linguistic development, stages 1, 2, and 5, over a period of time when MLU progressed from less than 2.0 to more than 3.5. Child speech was observed to be either adjacent or nonadjacent to an adult utterance. There were three kinds of adjacent child utterances: noncontingent; imitative; and contingent with contingent utterances observed as either linguistically contingent or contextually contingent. Definitions of terms used are as follows:

> Adjacent speech consisted of those child utterances that occurred after an adult utterance.
>
> Nonadjacent speech consisted of those child utterances that occurred without a previous adult utterance, or with a definite pause after a previous adult utterance.
>
> Noncontingent speech consisted of those child utterances that did not share the same topic as the preceding adult utterance.
>
> Imitative speech consisted of those child utterances that shared the same topic with the preceding utterance, but did not add information; that is, all or part of the preceding utterance was repeated.
>
> Contingent speech consisted of those child utterances that both (a) shared the same topic with the preceding utterance, and (b) added information to the preceding utterance. (pp. 524-528)

Contextually contingent utterances shared the same topic but not the same verb relation as the preceding adult utterance and were semantically related to the adult utterance. Linguistically contingent utterances shared the same topic and also shared the same verb relation as in the adult utterance. Subcategories included yes/no replies, routines, and recoding and these were found not to change over time. Contingent categories that were important developmentally were <u>expansions</u> (added information about the topic of a prior utterance), <u>alternatives</u> (added information by opposing an aspect of the topic in the prior utterance), and <u>expatiations</u> (added information to the prior utterance and introducing another, related topic).

Results indicated that adjacent speech was always greater than nonadjacent speech. Imitative speech decreased for all four children; noncontingent speech decreased for three children; and contextually contingent speech decreased over time for three children, although at no time did contextually contingent speech exceed 16% of a child's

total utterances. There was developmental change in the form of linguistic contingency over time with the addition or replacement of a constituent most common at stage 1. At stage 2 the predominant form of linguistically contingent speech consisted of repeating and adding or replacing while at stage 5 child utterances recoded and added to the adult utterance or recoded, repeated, and added to it. The most frequently repeated constituent at stages 2 and 5 was the verb which substantiated previous findings (Bloom, Lightbown, and Hood, 1975; Bloom, Miller, and Hood, 1975) that the verb is central to the child's acquisition of language.

Nearly three quarters of linguistically contingent speech occurred after adult questions with the same proportion of imitations occurring after adult nonquestions. Contextually contingent and noncontingent child utterances tended to occur after nonquestions. With development children gave more linguistically contingent responses to nonquestions although linguistically contingent responses were always more frequent after questions. Nonadjacent speech increased and linguistically contingent speech comprised less than half of the children's adjacent speech by stage 5 leading the investigators to conclude that it might be easier for children to produce spontaneous speech than to produce contingent speech. Adult imitative speech decreased and adult Wh- questions increased by stage 5 indicating reciprocity in the child's development of discourse as the children also imitated less and expanded more.

Results of the above study led to the conclusions that children learn to speak when spoken to even if at first they do not share the topic, and when the topic is shared it is often imitated with children

distinguishing between questions and nonquestions. Examination of linguistically contingent speech indicated that imitation actually changed with development as children learned to repeat, add and recode in conversation with adults.

Similar findings concerning repetition and adding were discussed by Keenan (1974) and Moerk (1977). Keenan described the ability of her 33-month-old twin sons to maintain discourse through repetition, modification, or substitution of a constituent in reciprocal messages. Moerk discussed replacement sequences in which the two children in his study applied structures previously imitated to new situations by repeating and replacing part of a noun or prepositional phrase.

Schiff (1979) reported the results of discourse analyses of the language of five hearing children of deaf parents based on the system of analysis outlined by Bloom et al. (1976). While nonadjacent speech was not discussed, results indicated that the majority of adjacent utterances was related to the preceding adult utterances by topic, that is were either contingent or imitative with relative frequencies of imitation decreasing and contingent speech increasing over time.

To summarize, imitation or repetition, plays a major role in the development of discourse. For many children it serves as a device for participating in conversation. For others imitation quickly changes to extensions or expansions of the adult utterance. In order to engage in discourse all children must learn to share the topic of the preceding adult utterance through some type of modification of its form and content to form their own utterances. Communicative intent of both the adult's preceding utterance and the child's repetition need to be considered when imitations are investigated.

Communication Interactions with Hearing Impaired Children

Interaction Styles of Mothers with Young Hearing Impaired Children

Studies of parental interaction with hearing impaired children indicate that deafness imposes constraints on the parent-child relationship which can negatively affect language development. Goss (1970) investigated the language of mothers of 20 deaf children ages 2.5 to 5.8 and 20 hearing children ages 2.6 to 4.9 years. Each mother-child pair was audiorecorded while the child placed pictures of a 12-frame sequence puzzle into place and the mother told the story to the child. It was found through administration of the Bales Interaction Process Analysis (1951) that mothers of hearing children asked more questions, used language showing solidarity and agreement, asked for suggestions, used more verbal praise, and used humor as interaction. Mothers of the deaf children gave more suggestions, used language that showed disagreement, and used humor as tension release. Moreover, mothers of the deaf children tended to end utterances in what the author described as an "unusual pitch rise" (p. 95). Goss attributed the differences in interaction to "the desire of the mother to communicate and the nature of the child's disability which makes communication difficult and frustrating" (p. 96).

The interactions of a mother of a 15-month-old deaf child were compared with data collected from interactions of mothers and 48 hearing children, aged one month to three years, by Ling and Ling (1972, 1974). The mother of the deaf child used less vocalizing, verbal interaction, body contact, and demonstration than did the mothers of hearing 14-month-old infants. After 17 months of training, interaction between the

mother and deaf child closely approximated interaction between mothers and hearing children of the same age. The Lings pointed out that when the child was 15-months-old, the mother had not fully accepted the fact that the child was deaf.

Comparisons were made between interactions of mothers whose hearing impaired children scored high on language tests and whose children had poorer scores (Greenstein, Greenstein, McConville, and Stellini, 1975). The Receptive-Expressive Emergent Language (REEL) Scale (Bzoch and League, 1971) was administered at six month intervals to 30 deaf children in an infant program and comparisons were made between ratings of mothers' interactions and language scores beginning at 24 months. All children had been in the program for at least 12 months prior to that time. Results indicated that coercive and touching behaviors were associated with the mothers of the children with poorer language while the mothers of children with better language were more accepting and showed more distal behaviors.

Results of a study by Collins (1969) indicated that the mothers of 30 deaf children ranging in age from 2;6 to 4;2 produced two-thirds of all communication. The primary intent of the mother's communication was to direct the behavior of the child which substantiated the conclusions of Goss (1970) regarding the behavior of the mothers of the hearing impaired children in his study.

Looney (1974) investigated verbal and nonverbal communication patterns of interaction between 16 mothers and their deaf preschool children and 16 mothers with their hearing preschool children. Interaction patterns were similar for mothers of deaf and hearing

children at younger ages (18 - 23 months) and greatest at the oldest ages (36 - 42 months). Results are dissimilar to those found by Ling and Ling (1972, 1974) however, in the study by Looney, none of the children had participated in a formal education program while interaction behavior of the mother in the Lings' study became more similar to mothers of hearing children after 17 months of training for both mother and child.

Interaction differences are therefore to be found among mothers of children who are developing language normally (Nelson, 1973), among mothers of deaf children (Greenstein et al., 1975) and between mothers of deaf children and hearing children (Goss, 1970; Ling and Ling, 1972, 1974). Differences may be due to a mismatch between mothers' interactive strategies and the child's structures and strategies (Nelson, 1973), to frustration caused by reduced communication ability in both mothers and children (Goss, 1970) and as Bloom and Lahey (1978) indicate, many differences may be characteristic of normal interaction at an earlier point in language development. The unusual intonation pattern found by Goss (1970) may have been requests by the mothers for verification of attention or understanding (Corsaro, 1977), or may have been examples of intonation patterns found with mothers of younger hearing children (Garnica, 1977), or, more likely, a combination of factors.

Mothers with nondirective, positive interactive strategies, Nelson (1973) concluded, have significant effects upon their children's language acquisition. This finding seems to be substantiated in light of the results of the studies by Goss (1970) and Greenstein et al. (1975). While cause cannot be determined, all investigators seem to

concur with the conclusion of Greenstein et al. (1975) that "the concept of a mother-child communication system implies a dynamically interactive cause-effect chain rather than simple one-way system of influence" (p. 26).

Few attempts have been made to study the effects of systematically manipulating specific interactive strategies. Ling and Ling (1974) reported that the mothers of deaf children in their study, when encouraged to use expansions, found it difficult to do so. Simmons-Martin (1976) reported success when parents were taught to use expansions and modeling with their severely hearing impaired children however.

Interactive strategies have been studied in more detail in classrooms for hearing impaired children although few have investigated the teaching strategies of teachers of preschool children.

Interaction Strategies of Teachers with Hearing Impaired Children

Craig and Collins (1970a and b), using an adaptation of the Flanders Interactive Scale (Flanders, 1965), observed teacher-child communication interactions in 12 classrooms in three schools for the deaf, two residential schools and one public day school. Interactions were analyzed at three levels, primary, intermediate, and high school. At least 70% of all observed interactions were teacher initiated at all levels of instruction for all formal subjects with no observed differences among classes using oral, manual, or combined modes of communication. The high degree of teacher dominated interaction resulted in the investigators suggesting that deaf students might lack the opportunity to initiate interactions rather than the communication ability to do so.

Using a system of interaction analysis adapted from Craig and Collins (1970a and b) and Parker and French (1971), Lawson (1978) recorded communication behaviors of deaf pupils in five intermediate classrooms in a residential school for the deaf where total communication was the philosophy. Two categories of student behaviors, self-directive and compliant, as well as teacher communications were analyzed. When student-compliant and teacher communications were combined, the results showed a lower ratio (2 to 1) for teacher initiated-student initiated interactions than that found in the Craig and Collins study. When mode of communication was analyzed, it was found that "total" or combined manual and oral was used 41% of the time while manual alone was used 34% of the time. In neither the Craig and Collins study nor the Lawson study did any student develop another person's idea either to build upon it or to relate it to his own ideas. Kretschmer and Kretschmer (1978) suggested that this finding indicates that deaf children are not developing the learning strategy of integrating information into their own thinking.

Wolff (1975, 1977) developed the Cognitive Verbal Non-Verbal Observation System (CVNV) to investigate interaction patterns and cognitive levels in 22 classes for deaf children in ten schools for the deaf where the three modes of communication, fingerspelling, oral, and total, were represented. Preschool through high school classes were included in Wolff's study in which teachers had previously been trained to promote concept formation in deaf children. The ratio of teacher to student talk in the preschool classes was equal; however, teacher initiated communication comprised 80% of the communication

observed. Analysis of the CVNV schedule indicated that the teachers at primary and intermediate levels showed more indirect behavior when compared to the teachers in the Craig and Collins (1970 a and b) study. In so-called cognitive classrooms teachers talked less, and students talked correspondingly more and initiated more communication than those in traditional subject classrooms. No comparison could be made with preschool classes since no other study had investigated teacher-child interactions in preschools; however, 95% of all communication with cognitive intent was either memory or factually based at this level. In the high school in cognitively based activities, 84.8% of the tasks were based on either memory or factual information. Therefore, at all levels, while teachers exhibited more indirect teaching styles, higher levels of cognitive functioning were not achieved.

Several studies have investigated the effects of questioning with deaf students upon cognitive levels and achievement. Holdt (1976) developed a system of instruction to study the relationship between the use of higher-level questions and knowledge-level questions and the achievement of second-grade achieving hearing impaired children in the area of social studies. One group of teachers used 70% knowledge-level questions and 30% higher-level questions while another group used 70% higher-level questions and 30% knowledge-level questions. Achievement in social studies was found to be positively affected by the use of the latter combination of question types.

Buckler (1978) investigated teacher strategies and in particular the relationship between questioning behaviors of four teachers and cognitive levels of children in a first, third, fifth, and seventh

grade class at an auditory-oral school for the deaf. The system of analysis used was based on Bellack, Kliebard, Hyman, and Smith's (1966) code and on the levels of thought described by Taba, Levene, and Elzey (1964). Results indicated that teachers talked 54.1% of the time and students 45.9% which was a much higher percentage of student talk than the 20% found by Craig and Collins (1970a and b). However, 90% of the student talk in Buckler's study was responding; therefore, teacher initiated communication was dominant as has been found in other studies of teacher-child interaction. Although teachers initiated more communication, an analysis of utterances and utterance clusters showed that students had more turns to interact which the investigator interpreted as evidence that the children were being provided opportunities to develop skills in communication. Level of thought did not affect question types which were consistently used in overall interaction and at all three levels of thought. Rather content, internal structure, and expected response were the important factors. Buckler found that:

> The development of higher level thinking in deaf children is dependent upon the demand by teachers for such thinking, and . . . teacher questioning is the principal means by which this development is achieved. (p. 83)

Although techniques for questioning were effective, it was found that overall teacher strategies did not change within individual teachers, that "the manner of teaching was similar whether factual data or abstract thought was the focus" (p. 83). Buckler concluded with the recommendation that teacher reacting moves, utterances following child responses, should be researched for their effect on subsequent responses of hearing impaired children. In other words, what are the effective

reacting strategies used by teachers to encourage continuing discourse?

Analyzing strategies that teachers employed when oral communication was not successful, Erber and Greer (1973) studied the interaction styles of ten teachers of hearing impaired children, ages 8-15 years. Although teaching styles varied, teachers tended to exhibit one of four strategies whenever oral communication failed between teacher and student; (1) repetition; (2) emphasis; (3) structural change; and (4) supplementary information. Not all teachers employed all four strategies; emphasis was the only strategy used by all ten teachers while seven teachers used repetition. Results indicated that, similar to the findings in Buckler's study, teachers develop individual strategies for communication interactions which do not vary within groups and therefore are not necessarily dependent upon the learing styles of children.

While Ling and Ling (1974) and Simmons-Martin (1976) reported conflicting results with attempts to manipulate the specific strategy of expanding language by parents of deaf children, Scroggs (1975) reported on the use of expansions with teachers of deaf children. Five teachers of preschool hearing impaired children in a summer program were trained to use expansions defined according to Brown and Bellugi (1964). Teachers were trained to use a 50% level of expansions and to expand orally all expandable oral and nonoral communications of the children. A 50% level was used because "below that level there seemed to be a tendency for the children to be talking about one thing and the teachers about something else" (p. 351). By the end of five weeks all teachers maintained a 50% level of expansions. From the third week until the end of the sixth week there was an increase in expandable communications

in all classrooms except in one that had three year old children. Since the increase in expandable communications could have been caused by other factors such as familiarity with the teacher, it was decided to continue the study with another group of teachers and children. Subsequently, three teachers of hearing impaired children ages six to eight were trained to use expansions at a 50% level. One class was composed of children with moderate hearing losses, children in the second class were profoundly deaf, and those in the third class were profoundly deaf with learning and language deficiencies. All children had been taught by the teachers for four months and were being taught orally. In the first two classrooms, oral and nonoral communications paralleled the use of expansions. In the third classroom where children were described as having language and other learning problems, no parallel movement was noted although there was an overall increase in nonoral communication and decrease in oral communication by the children. Results were inconclusive since, of the first two classes, among the three variables of expansions, oral, and nonoral communication rates, it was impossible to determine cause. Nevertheless, the investigator recommended the use of expansions and suggested that their use requires teachers to respond not only to communications of the child but to the content of the communications.

In summary, while studies of classroom interactions with preschool children have been few (Scroggs, 1975; Wolff, 1977), results from these and studies of interactions with older deaf children indicate that: (1) teachers develop teaching strategies which remain constant regardless of content or learning styles of children; (2) teachers can be taught to change their interactive strategies; (3) the level of

expectation and response expected are determining factors in classroom interactions; (4) questioning techniques are crucial to classroom learning and to discourse development but remain to be empirically studied with preschool children; (5) teacher initiated talk dominates classroom communication at all levels; and (6) interactive strategies noted in normal language development need to be empirically studied to determine the efficacy of the what, when, and how of their application to hearing impaired children.

Relevant Studies of Language Learning in Deaf Children

Numerous investigators have studied language acquisition in young hearing impaired children based on mode of communication. Gesture systems of five hearing impaired children of hearing parents were studied by Goldin-Meadow and Feldman (1975) while Skarakis and Prutting (1977) and Curtiss, Prutting, and Lowell (1979) investigated the semantic functions and communicative intents of gestures and oral language of hearing impaired children enrolled in an oral program. Curtiss et al., using MLU as a measure of linguistic proficiency with two to four year old deaf children, determined that MLU reflected more than one aspect of linguistic ability. The children with highest MLU not only encoded a wide range of semantic functions but also combined categories thereby expressing relationships between categories. The ability to express pragmatic functions, on the other hand, had developed in the hearing impaired children by age two, as had been found by Dore (1973) with hearing children, and was not dependent on

oral language. The investigators concluded that MLU alone does not adequately reflect communicative ability when both linguistic and nonlinguistic behaviors are considered. The subjects in the Curtiss et al. study displayed hearing losses ranging from severely hard of hearing to profoundly deaf. A major conclusion resulted from the finding that children with comparable hearing losses displayed individual differences in the use of their residual hearing as reflected in aided response levels. It was concluded that aided rather than unaided hearing levels might better predict language ability.

Studies of the acquisition of sign language have proliferated during the last decade and are recognized as crucial to an understanding of the origins of language in many deaf children. Two studies pertinent to the present study will be reviewed. Edelstein (1978) investigated semantic-syntactic relations in total communication of ten deaf children ages six to nine. Mean length of utterance (MLU) was between 2.0 and 2.5 with an utterance defined as "including any manually signed, fingerspelled, vocalized, and/or gestured expression occurring between two pauses" (p. 13). However, it cannot be assumed that utterances were encoded simultaneously through oral and manual modes. Rather, all modes were analyzed with no specification of which were actually used. The semantic categories described in the research literature for hearing children (Bloom, 1970; Brown, 1973; MacDonald and Blott, 1974; Miller and Yoder, 1974; and Schlesinger, 1971) accounted for 50% of the two and three word utterances of the subjects and for 75% when word order was not considered. It was concluded that the consistent occurrence of reversals of word order reflecting both instability of a rule system and in some cases

order of events being represented, additions of substantive words but not functors or grammatical morphemes in utterances longer than three words, and repetition of the referent to encode plurals and superlatives, indicate that the deaf children did not exhibit simple language delay. Deviances then were apparent even though the method of instruction was Signed English in combination with oral language and tend to substantiate the conclusions of Kretschmer and Kretschmer (1978) reached as a result of their own research plus an extensive review of the research literature:

> The semantic/pragmatic bases of gesture and sign language are determined in part by their spatial/visual orientation. Therefore, the cognitive/symbolic organization must differ in many respects from auditorily based languages such as spoken English. Regularizing surface structure forms, as suggested by Signed English advocates, does not guarantee that knowledge of the semantic/pragmatic bases of English will be acquired. Indeed the usefulness of such systems needs to be systematically explored. (p. 140)

The second study involving sign language concerns not hearing impaired children but two hearing children of deaf parents whose acquisition of question forms in both spoken English and American Sign Language was investigated. Sequence of development of form in both languages followed that reported for hearing children learning only spoken language, however both parents and children most often used a generalized Wh-question sign to encode all Wh-forms. While spoken language questions increased in structural complexity for the children, signed questions did not. The generalized Wh-form occurred in initial, medial, or final position and often was repeated, that is, included in both initial and final positions in both parent and child sign language.

Other studies indicate that deaf children's question formation in

oral language (Romanik, 1976), and comprehension of question forms in written language (Quigley, Wilbur, and Montanelli, 1974) develop in the same sequence as that reported for hearing children but at a slower rate of development.

Research studies of the ability of deaf children to imitate oral language indicate that the children were unable to benefit from syntactic cues when requested to imitate adult utterances (Lowenbraun, 1969; Lowenbraun and Affleck, 1970) and often violated the sentence structure of the adult utterance in their imitative utterance (Sarachan-Deily and Love, 1974). Geers and Moog (1978) investigated spontaneous speech and elicited imitations of 52 hearing impaired children ages four to 15. When syntactic maturity of both structures were related to reading achievement, results indicated that imitation skills were better predictors of beginning reading ability with spontaneous language more related to advanced reading levels. Geers and Moog concluded, based on the finding of more mature structures in the spontaneous language of hearing impaired children than would be expected of hearing children with similar language scores (Lee's Developmental Sentence Analysis, 1974), that the language exhibited by the deaf child may not be simple delay as had also been concluded by Edelstein (1978).

Therefore the studies of language development in deaf children indicate both delay and deviances with results for strategies such as imitation and responding to questions inconclusive in their relationship to the development of language proficiency.

Summary

Results of studies of communication interactions with young hearing children and with young hearing impaired children have led to a closer alliance between what is becoming known about normal language development and language development in deaf children. As a result of a survey of language methods used by schools for the deaf in the United States and Canada, Nelson in 1949, emphasized:

> It must be kept in mind that the purpose of teaching language is to enable the child to communicate with people; therefore, language should be taught in the way it is to be used. Correct usage of language can be habituated only through constant usage in natural situations. (p. 396)

Thirty years later, both teaching and learning strategies are being investigated and used to further, not only the acquisition of language form but increasingly, the integration of form, content, and use by deaf children. Nevertheless, Kretschmer and Kretschmer (1978) concluded:

> It is unfortunately true that despite 150 years or more of concern, quality research that specifies in detail the nature of linguistic problems associated with childhood deafness is still lacking. (p. 85)

In addition, information concerning effective interactive strategies with hearing impaired children remain fragmentary and equivocal. The <u>how</u> of teaching still rests mainly on the intuitions of teachers.

Chapter III

THE SUBJECTS, MATERIALS, AND PROCEDURES

In this chapter are discussed the subjects, the materials, the manner and techniques of collecting the data, and the coding system employed to determine both the discourse analyses and the effect of teacher questions and other interactive strategies on the oral language of young hearing impaired children.

The Subjects

The subjects of the study were four teachers, two tutors, and ten hearing impaired children in the preschool department of a large oral school for the deaf in the metropolitan New York area. The supervisor of the preschool department selected the children and asked their teachers and tutors to participate in the study. In addition, the children's parents gave written permission for all of the sessions.

Nine of the children met the following qualifications:

1. Severe to profound deafness sustained by age 18 months of 90 dB puretone average (ANSI, 1969) or poorer.

2. Chronological age of 4.5 to 6.5 at the time of inclusion in the study.

3. Hearing aids worn for at least two years prior to inclusion in the study.

4. No known additional handicapping conditions as reported in school records. (See Appendices A and B for profiles and hearing levels of individual children.)

In addition, one child with a 75 dB puretone average who met all of the other qualifications was included in the study.

The preschool department at the cooperating school has seven classes consisting of Nursery I, Nursery II, and Kindergarten. One class at each level was integrated with hearing children of the same age with approximately the same number of hearing children as hearing impaired children. Classes ranged in size from six for all deaf classes to 14 for integrated classes. Each class had a teacher and a teacher assistant. In addition, each hearing impaired child was seen by a speech and language tutor individually three to four times a week for 20 minute sessions.

Of the ten hearing impaired children, one was selected from one Kindergarten class, two from another, three and four respectively from each of two Nursery II classes. There were four boys and six girls in the sample and ages ranged from four years, eight months (4;8) to six years, five months (6;5). Of the tutors, one taught seven of the children and the other three.

The four teachers were all certified by New York State and the Council on Education of the Deaf and had taught hearing impaired children from two to 12 years. Two of the teachers held M.A. degrees, and one an M.Ed. in education of the deaf. The fourth teacher held a B.S. degree in education of the deaf and was in the process of completing an M.S. in early childhood. Of the two tutors, one held two M.A. degrees, one in education of the deaf and one in speech pathology. The other tutor held a B.S. degree in speech pathology and a M.S. in education of the deaf. The first tutor had taught hearing impaired children for 11

years and the second for three years. Each tutor was certified by New York State and the Council on Education of the Deaf to teach hearing impaired children.

Equipment and Materials

Recording Equipment

All videorecordings were made using the SONY AV 8400 S Porta-pak unit on a SONY V30-H videotape. The SONY AVC-3450 camera with zoom lens was used. The Porta-pak deck was attached to an AC power cable. In addition, all video sessions were also audio-recorded using a Wollensak 1520 AV half-track monaural tape recorder. The classroom sessions were recorded using a wireless microphone system Edcor Sensa minimike model SM2 with Edcor St 2A receiver. The individual sessions were recorded using a SONY ECM 220 electret condenser microphone with a Shure A55M shock mount on a Atlas desk stand.

Stimuli for the Individual Sessions

To provide commonality of stimuli across sessions, the same toys were available for all individual sessions. Criteria for the selection of toys were that they:

1. Be durable and of a size suitable for table top use.
2. Be typical of toys used by four to six year olds.
3. Allow for manipulative and/or representative play.
4. Be conducive to interaction and discussion by two people. The toys are described in Appendix C.

In addition, a six-picture sequence story was discussed with each child. The same story was used for all individual sessions. The

story was designed to depict people, animals, and events familiar to young children with the occurrence of an unusual situation. In the foreground events occur between a boy and his dog and between the boy and a policeman that can be described using verb relationships present in the language of young children. Various animals in cages are in the background. The six pictures are in color, noncaptioned, and each 8½" by 11" in size. A black and white version of the story is presented in Appendix D.

Procedures

There were three major portions of the study involving each child:

1. Two preliminary videotaped sessions:
   - 1.1 A half-hour period in regular preschool activities with the classroom teacher and other children. This session was transcribed and informally analyzed for teacher and child behaviors.
   - 1.2 A 15-minute training session with the investigator to familiarize the children with the toys and story. This session was not transcribed.
2. Two videotaped sessions:
   - 2.1 A 15-minute session of the child and his teacher playing with the toys and discussing the story.
   - 2.2 A 15-minute session of the child and his speech and language tutor playing with the toys and discussing the story.

Session 2.1 and 2.2 were transcribed and analyzed according to

the procedures described in the next section. The data from these two sessions formed the basis for the study.

3. A session was spent in each child's home in which the parent(s) was interviewed. The entire session of from one and a half to two hours was audiorecorded. The information from this session was used to complete the family and medical history reported in the school records.

Instructions to Teachers and Tutors

Prior to the actual sessions, a group session was held with the tutors and teachers to explain the purposes of the study. They were told that the focus of the study was the language of the children and that the teachers were to interact with the child during each classroom session. It was explained that the individual sessions were to be treated as language lessons and that they should interact with the child "as you usually do in order to stimulate language".

The toys and story book were displayed and the teachers and tutors were invited to inspect them. They were told that the children would become familiar with the materials in a preliminary session with the investigator.

Prior to the individual and class sessions, written instructions were given to the adults. Procedures for use of the materials were as follows:

> The toys should be used first with the children--whichever ones and however you wish. At the end of eight (8) minutes I will signal and you should then use the story--again however you wish. When you have finished with the story, go back to the toys for any remaining time. (Full instructions are listed in Appendices E and F.)

Procedures for Classroom Session

The procedures were designed to include both video and audio tapes for purposes of transcription as described in Schiff (1976). In each classroom situation the child being observed wore a radio frequency microphone for maximum mobility. The teachers were instructed to interact with the child during the taping period and to attempt to have only one adult at a time speaking to the child during the period. Prior to actual taping in the classroom, a mock situation was conducted to familiarize the children with the procedure. During the actual session, the child being observed was taped in regular daily classroom activities. One to three taping sessions were required to obtain the half-hour of tape. All of the children wore their individual hearing aids during each session except for the three children in one Nursery II class where radio frequency group aids were worn by the children. All aids were always tested prior to each session to ensure that they were in good working condition.

Procedures for Individual Sessions

For each individual session a table and two small chairs were arranged in a quiet room in the preschool department. All toys were in place on a second table behind the chairs and the adults were instructed to use the toys first with the children "whichever ones and however you wish". At the end of eight minutes the investigator signaled, and the adult presented the story. If any time remained the adult reintroduced the toys. This same procedure was followed by the investigator in session 1.2.

In each of the individual sessions the microphone for the

audiorecorder was held in a shock mount on a stand to minimize table noises. The microphone was placed approximately six inches from the child. All children wore their individual hearing aids for each session. The hearing aids were checked immediately prior to each session to ensure that they were in good working condition.

All sessions were videotaped by the investigator except for session 1.2 which required participation of the investigator. Both the investigator and the assistant (for session 1.2) were trained in the use of the equipment by a media expert in the Audio-Visual Department of Teachers College, Columbia University.

Transcription and Analysis

Transcription of the Tapes

Videotapes were transcribed following the conventions for transcription of videorecordings of child language established by Miller, Lifter, Tanouye, and Higgins (1976). (Appendix G) Audio-recordings were transcribed concurrently with the videotapes.

All transcriptions were made by either the investigator and a trained assistant or by two trained assistants. The assistants were student teachers in a master's program in education of the deaf and were familiar with the speech and language of hearing impaired children. Both transcribers agreed upon all content for it to be transcribed as intelligible. Utterances that were partially or wholly unidentifiable as words were transcribed as a series of dashes, one dash for each syllable. Intelligible utterances were transcribed in whole words with phonetics (IPA) used when necessary for idiosyncratic utterances. All

linguistic and nonlinguistic context was transcribed with attention being given to the direction of child gaze and to the nonoral behaviors of the child and of the adult. The original tapes were later timed and one-minute intervals recorded onto the transcriptions of the individual teacher and tutor sessions.

System of Analysis

Upon completion of the transcriptions, intelligible utterances were numbered in each session, teacher and tutor for each child, for both the play and story situations. Total utterances were then computed by situation across speakers for each session and the mean number of utterances per minute determined for each speaker. Mean length of utterance (MLU) was computed for each child by situation and session and for each adult by situation and session.

A four column discourse paradigm was then devised and included:

1. Adult Utterance/Elicitation: the adult utterance immediately preceeding the child utterance, if present.

2. Child Utterance/Response: the child utterance.

3. Adult Reaction: the adult utterance(s) immediately following the child utterance, if present.

4. Child Subsequent Response: the child utterance(s) immediately following the adult reaction, if present.

Frequencies and percentages and, where appropriate, proportional distributions were computed of the following aspects of adult-child interactions in order to present the results and as a basis for discussion.

The following analyses were completed in order to respond to the first research questions:

1. The total adult corpus was analyzed for:
   1.1 Deviations in the adult model: adult utterances that were not grammatically correct, those that were interrupted and then self-corrected, those that were interrupted and not completed, and those that were considered to be distorted in any way, either high pitched, spoken sotto voce, spoken at the same time as the child (talkovers), or with words run together.
   1.2 Speech emphasis: adult utterances that referred to the children's speech production, either through indications that the child repeat his own utterance using better speech or repeat a model presented by the adult with emphasis on patterns of connected speech or correction of word production.
   1.3 Adult Utterance type: question or nonquestion.
2. The total child corpus was analyzed for Non Adjacent utterances including immediate self repetitions.
3. Child utterances following and adjacent to adult utterances were coded as Child Responses and were analyzed according to contingency on the preceeding adult utterance: (See Appendix I).
   3.1 Non Contingent and Repeat self utterances
   3.2 Topic-related child utterances
      3.21 Linguistically Contingent utterances

3.22 Contextually Contingent utterances

3.23 Imitations

All child utterances were placed in one of three major categories for purposes of coding the adult reactions: Linguistically Contingent/ Contextually Contingent (LC/CC), Imitation/Repeat self (I/Rs), or Non Adjacent/Non Contingent (NA/NC).

4. Adult Reactions included the immediate utterance following each child utterance and were coded in relationship to each of the three major child utterance categories: LC/CC, I/Rs, or NA/NC as:

   4.1 Reaction or no reaction

   4.2 Contingency on the preceding child utterance (See Appendix J)

   4.3 Utterance type: question or statement

   4.4 Repeat/Not Repeat: utterances which repeated only, repeated and expanded, recoded but not repeated, and not repeated the preceeding child utterance.

5. Child Subsequent Responses (CSR) included all child utterances following adult reactions and were coded according to:

   5.1 The discourse relationship i.e., Linguistically Contingent (LC), Contextually Contingent (CC), Imitation (I), Repeat self (Rs), or Non Contingent (NC), to all combinations of adult utterance type and discourse contingency. (See Appendix I).

   5.2 No Responses (NR), Non Oral (NOR), and Unintelligible (Unin) CSRs to the above adult utterance combinations.

Based on Bloom's commentary on accountability of evidence (Schacter, Kirshner, Klips, Friedricks, and Sanders, 1974), all interactions were not determined prior to the actual coding step for each of the major analyses sections. Rather, the data were examined again and again for consistencies in adult and child behaviors that might be part of interactive strategies and thus aid in language learning in young hearing impaired children. The second research question which concerned adult interactive strategies was analyzed based on the findings of certain consistencies in the data.

Reliability

Transcription

Four graduate students in a master's program in education of the deaf served as assistants in transcribing the data. The investigator trained each student individually in the transcription procedure. Each videotape was then transcribed by a team of two which usually included the investigator. Any utterance not agreed upon by the two members of a team was coded as unintelligible.

Alternating the story and play situations and beginning with the third minute of each, ten successive utterances for each child with his teacher and with his tutor were retranscribed by two experienced teachers of the deaf who followed the same procedures as the original teams of transcribers. The percentage of agreement between the two transcriptions, each utterance being scored as same or different, was .83.

Coding

All coding of the transcribed data was done by the investigator. To determine reliability the same sample of ten successive child utterances plus ten adult reaction utterances were recoded by a graduate student in education of the deaf. A total of 20 utterances per child was tested for reliability of coding. Percentage of agreement between the two coders was .81.

Chapter IV

RESULTS: DISCOURSE ANALYSIS

It was the objective of the present investigation to analyze the relationships among the utterances of preschool hearing impaired children and their teachers and tutors for the purpose of studying influences upon discourse development in deaf children. The results of these findings are reported in this chapter for Research Question I. Research Question II: Do the interaction strategies employed by teachers and tutors change within and/or across discourse situation with young hearing impaired children?, is addressed within the results for Question I and discussed separately in the discussion chapter.

To respond to the first research question: What is the linguistic relationship between utterances of young hearing impaired children and utterances of their teachers and tutors during discourse?, analyses of total utterances, topic-related child discourse, adult reactions, and child subsequent responses (CSR) were performed using an adaptation of the discourse analysis outlined by Bloom, Rocisanno, and Hood (1976). Results will be reported for total adult and child utterances and for each of the three utterance groups: topic-related child discourse, adult reactions, and child subsequent responses (CSR).

Total Utterances

There were 9,127 utterances for all speakers, 3,370 spoken by the

ten children and 5,757 by the six adults. Of the children's utterances, 2,575 or 76.4% were intelligible while 99.6% of the adults' utterances were intelligible. Table 1 presents the frequencies and percentages of total utterances by situation, play and story, across speakers for each session. The children spoke 36.9% of the total utterances or 31.0% of the total number of intelligible utterances while 69.0% of the intelligible utterances were spoken by the adults.

Mean Number of Words per Minute

Table 2 displays the mean number of total utterances per minute. In general, results indicated that the children spoke more utterances per minute during the story than during the play situation while there was a difference between teachers and tutors for the two situations. All children spoke more utterances per minute with their tutors than with their teachers with the exception of two children during play, and the tutors spoke more utterances per minute than the teachers with each child with one exception.

Mean Length of Utterance (MLU)

Child MLU by Situation and Session. Mean length of utterance (MLU) was computed twice for each child during each situation and for each session, first, for all intelligible child utterances (total MLU) and second, for child utterances minus imitations and self-repetitions (MLU -I/Rs). The mean difference between total MLU and MLU -I/Rs was 0.11 for seven children with total MLU higher than MLU -I/Rs. For the child with the lowest intelligibility, MLU -I/Rs was 0.06 higher than total MLU. However, due to the child's decreased intelligibility, fewer utterances were available for analysis than for the other children.

Table 1
Frequency and Percentage of Total Utterances by Situation Across Speakers for Each Session[a]

(N = 9,127)[b]

	MLU[c] Group	Situation	Child f	Child %		Teacher f	Teacher %	Total f	Total %	Child f	Child %		Tutor f	Tutor %	Total f	Total %
Art	Ia	Play	51	26.7	T-II	140	73.3	191	100	52	32.3	Tu-A	109	67.7	161	100
		Story	51	28.8		126	71.2	177	100	69	44.5		86	55.5	155	100
Kathy	Ia	Play	37	18.0	T-II	168	82.0	205	100	107	30.7	Tu-A	242	69.3	349	100
		Story	48	35.8		86	64.2	134	100	100	39.2		155	60.8	255	100
Iris	Ia	Play	54	23.8	T-II	173	76.2	227	100	113	30.1	Tu-A	263	69.9	376	100
		Story	84	37.0		143	63.0	227	100	95	39.6		145	60.4	240	100
Betty	Ib	Play	57	29.1	T-I	139	70.9	196	100	101	28.9	Tu-A	249	71.1	350	100
		Story	37	34.9		69	65.1	106	100	49	35.5		89	64.5	138	100
Randy	Ib	Play	139	43.2	T-I	183	56.8	322	100	110	32.4	Tu-A	229	67.6	339	100
		Story	27	30.3		62	69.7	89	100	115	43.2		151	56.8	266	100
Martin	Ib	Play	37	25.2	T-I	110	74.8	147	100	98	34.7	Tu-A	184	65.3	282	100
		Story	72	39.8		109	60.2	181	100	97	40.1		145	59.9	242	100
Valerie	II	Play	75	32.6	T-III	155	67.4	230	100	104	28.9	Tu-B	256	71.1	360	100
		Story	60	35.9		107	64.1	167	100	60	38.5		96	61.5	156	100
Debbie	II	Play	63	35.2	T-IV	116	64.8	179	100	115	34.2	Tu-B	221	65.3	336	100
		Story	55	38.5		88	61.5	143	100	49	39.8		74	60.2	123	100
Sally	II	Play	162	56.4	T-I	125	43.6	287	100	126	45.0	Tu-A	154	55.0	280	100
		Story	68	45.9		80	54.1	148	100	110	49.3		113	50.7	223	100
Danny	II	Play	188	57.8	T-III	137	42.2	325	100	161	34.8	Tu-B	301	65.2	462	100
		Story	90	52.9		80	47.1	170	100	84	45.9		99	54.1	183	100
		f	1,455			2,396		3,851		1,915			3,361		5,276	
		$\bar{X}$ %		37.8			62.2		100		36.3			63.7		100

[a]Each child engaged in two situations, play and story, during two sessions, one with the child's teacher and one with the child's tutor.

[b]N = 9,127 which includes 8,311 intelligible and 816 unintelligible utterances for all speakers.

[c]MLU Group: Ia = MLU 1.25-1.46
Ib = MLU 1.55-1.65
II = MLU 1.87-2.46

Table 2
Mean Number of Utterances per Minute by Situation Across Speakers for Each Session

(N = 9,127)[a]

	MLU[b] Group	Situation	Number of Utterances per Minute Time in Minutes	Child	Teacher	Number of Utterances per Minute Time in Minutes	Child	Tutor
Art	Ia	Play	T-II 8.8	5.8	15.9	Tu-A 10.9	4.8	10.0
		Story	5.8	8.8	21.7	6.6	10.5	13.0
Kathy	Ia	Play	T-II 10.8	3.4	15.5	Tu-A 9.5	11.3	25.5
		Story	4.6	10.4	18.7	6.6	15.1	23.5
Iris	Ia	Play	T-II 9.3	5.8	18.7	Tu-A 10.0	11.3	26.3
		Story	7.0	12.0	20.4	6.3	15.1	23.0
Betty	Ib	Play	T-I 10.9	5.2	12.7	Tu-A 11.6	8.7	21.5
		Story	5.1	7.2	13.5	5.3	9.2	16.8
Randy	Ib	Play	T-I 13.2	10.5	13.9	Tu-A 9.4	11.7	24.4
		Story	3.7	7.2	16.5	7.7	14.9	19.6
Martin	Ib	Play	T-I 9.6	3.8	11.5	Tu-A 8.6	11.4	21.4
		Story	6.0	12.0	18.2	7.1	13.7	20.4
Valerie	II	Play	T-IV 10.3	7.3	15.0	Tu-B 11.1	9.3	23.0
		Story	6.3	9.6	17.1	5.9	10.2	16.3
Debbie	II	Play	T-III 9.6	6.6	12.1	Tu-B 11.2	10.3	19.7
		Story	5.6	10.0	15.7	3.8	12.9	19.5
Sally	II	Play	T-I 11.2	14.5	11.2	Tu-A 8.7	14.5	17.7
		Story	4.6	14.8	17.4	5.7	19.3	19.8
Danny	II	Play	T-III 10.9	17.2	12.6	Tu-B 12.1	12.9	25.0
		Story	5.2	17.3	15.4	4.5	18.7	22.0
			$\bar{X}$ of means	9.5	15.7		12.3	20.4

[a] Includes intelligible and unintelligible utterances.

[b] MLU Group: Ia = MLU 1.25-1.46
Ib = MLU 1.55-1.65
II = MLU 1.87-2.46

For the two children with the highest MLU, MLU -I/Rs averaged 0.06 and 0.10 higher than total MLU indicating that for these children imitated utterances were not longer than utterances not imitated. The two children with MLU below 1.38 spoke longer utterances during play while the eight children with MLU ranging from 1.46 to 2.46 spoke longer utterances during the story situation. Table 3 presents the mean length of utterance (MLU) for all intelligible utterances for each speaker by situation.

For purposes of further analysis, the children were divided by total MLU into two major groups, Group I and Group II, comparable to Stage 1 and Stage 2 as described by Brown (1973). For certain analyses Group I was further divided into two subgroups, Ia (MLU < 1.50) and Ib (MLU 1.55-1.65) corresponding to Brown's early Stage 1 and late Stage 1 respectively. Group II (MLU 1.87-2.46) approximated Brown's Stage 2.

Adult MLU Compared with Child MLU. In Figures 2 and 3 are displayed comparisons of adult and child MLU. With few exceptions higher adult MLU corresponded with higher child MLU.

Comparison of Adult Single Word Utterances (SWU) and Child MLU. It had been predicted that there might be a relationship between an adult's proportional use of single word utterances and a child's MLU with the adults using more single word utterances with children whose production was predominately single words. The mean percentage of SWU used with the children with lower MLU, Group I, was 21.0% of the total utterances spoken to the group while 11.7% of those spoken to Group II were SWU. The overall use of single words by the adults in the study, moreover, appears to have been an individual strategy perhaps related to communicative intent and will be examined further in the discussion chapter (p. 171).

Table 3
Mean Length of Utterance (MLU) for Each Speaker by Situation

	MLU[a] Group	Situation	Child	Teacher	Child	Tutor	$\bar{X}$ Child
Art				II		A	
	Ia	Play	1.28	4.08	1.31	3.16	
		Story	1.19	5.08	1.22	3.78	
			x=1.23	x=4.58	x=1.26	x=3.47	1.25
Kathy				II		A	
	Ia	Play	1.65	4.57	1.20	3.33	
		Story	1.46	5.22	1.19	3.51	
			x=1.55	x=4.90	x=1.19	x=3.27	1.37
Iris				II		A	
	Ia	Play	1.32	4.39	1.34	4.17	
		Story	1.54	5.21	1.64	4.37	
			x=1.43	x=4.80	x=1.49	x=4.27	1.46
Betty				I		A	
	Ib	Play	1.47	4.09	1.31	3.81	
		Story	1.90	4.96	1.55	3.87	
			x=1.68	x=4.52	x=1.42	x=3.84	1.55
Randy				I		A	
	Ib	Play	1.36	4.50	1.34	3.69	
		Story	2.05	5.16	1.56	4.13	
			x=1.70	x=4.83	x=1.45	x=3.91	1.57
Martin				I		A	
	Ib	Play	1.61	4.56	1.42	3.81	
		Story	1.89	5.56	1.69	4.15	
			x=1.75	x=5.06	x=1.55	x=3.98	1.65
Valerie				IV		B	
	II	Play	1.38	4.30	1.46	4.84	
		Story	1.92	5.37	2.74	5.48	
			x=1.65	x=4.84	x=2.10	x=5.16	1.87
Debbie				III		B	
	II	Play	1.79	4.91	1.88	4.82	
		Story	2.70	5.51	2.30	4.77	
			x=2.24	x=5.21	x=2.09	x=4.80	2.17
Sally				I		A	
	II	Play	2.22	5.18	2.34	4.41	
		Story	2.71	6.26	2.55	4.41	
			x=2.46	x=5.72	x=2.44	x=4.41	2.45
Danny		Play		III		B	
	II	Story	2.50	5.11	2.34	4.38	
			2.51	5.50	2.51	4.90	
			x=2.50	x=5.30	x=2.42	x=4.64	2.46
$\bar{X}$ of Means			1.82	4.98	1.74	4.19	1.78

[a]MLU Group: Ia = 1.25-1.46
Ib = 1.55-1.65
II = 1.87-2.46

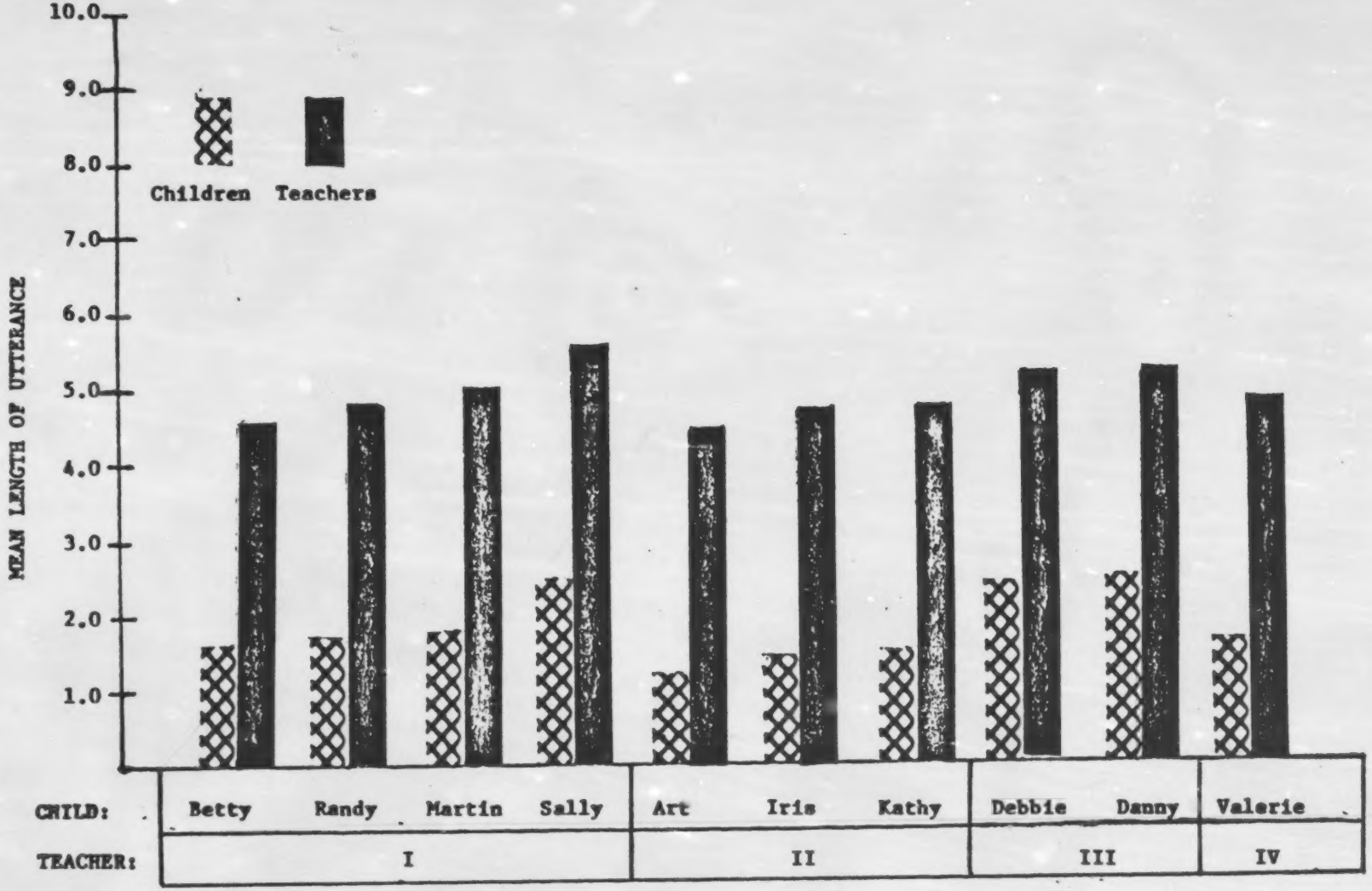

FIGURE 2. Comparison of Child Mean Length of Utterance (MLU) with Teacher Mean Length of Utterance (MLU)

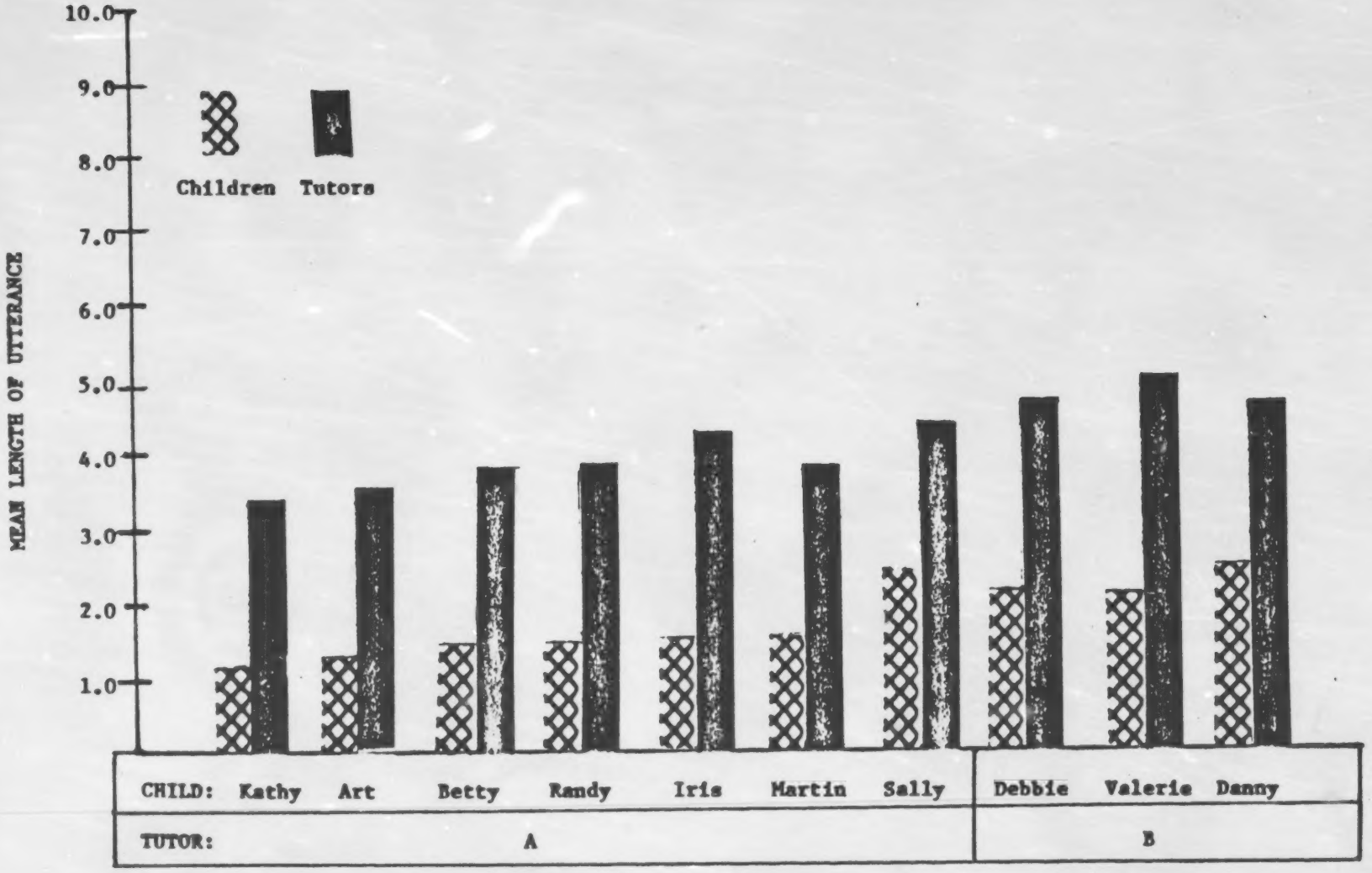

FIGURE 3. Comparison of Child Mean Length of Utterance (MLU) with Tutor Mean Length of Utterance (MLU)

The Adult Model

Deviations in the Adult Model. In order to describe further the model available to the children, analyses were made of adult utterances that were not grammatically correct, those that were interrupted and then self-corrected, those that were interrupted and not completed, and those that were considered to be distorted in any way, either high pitched, spoken sotto voce, spoken at the same time as the child (talkovers), or with words run together. As had been expected, a very small percentage of utterances was ungrammatical, little more than one-third of one percent. Catenatives were not considered ungrammatical, for example, "wanna" and "gonna", since young children learn these as one morpheme (Brown, 1973). Distorted utterances comprised 2.8% of the total number of adult utterances with a range of 0.8% to 10.0% for individual adults. If an adult's speech were distorted, it tended to be distorted in a particular way. For one adult initial words were often run together and were difficult to discriminate even by the investigators. Two other adults occasionally used high pitched voices. Another used talkovers, that is, talked at the same time as the child. Self-corrected and imcomplete utterances comprised another 2.6% of the total. While not presenting a perfect model, they allowed for language learning, for during self-corrected utterances the adult corrected her own syntax or in most cases lexicon. Incomplete utterances occurred when the adult interrupted her own speech to allow the child to speak.

The original transcriptions disclosed use of repetitives by the children; verbs were often repeated either with chained actions by the child, for example, "walk, walk, walk" or "up, up", while walking a doll along the table or up the stairs. The adult speech was analyzed, therefore,

for the existence of repetitives. While there was at least one instance in the speech of each adult with a mean percentage of a little more than one-half of one percent (0.56%) for all, one teacher used repetitives in 2.3% of her utterances.

Speech Emphasis. It had been expected that the adults, since they had been instructed to conduct the session "as you usually do", would engage the children in direct work on speech. Inspection of the video-tapes and transcriptions of the protocols disclosed that the adults seldom directly requested the children to repeat the adult or improve their speech production. An average of 10.3% of the total adult utterances referred to the children's speech production. The child was encouraged to repeat his own utterance using better speech, or to repeat a model presented by the adult with emphasis on patterns of connected language or correction of speech production. Rather than directly request the child to repeat, the adults used hand, body, or head movements which indicated to the child that a word or pattern was to be repeated. One adult often covered her mouth thus implying that the child should listen and repeat. Emphasis on speech varied from adult to adult with 16.5% of her utterances related to speech work by one tutor and 10.8% by one teacher with a low of 2.7% by another teacher. Speech was corrected according to the individual needs of each child as words and patterns of speech appeared in the conversation about play objects and the story.

Adult Utterance Type. Adult utterances were analyzed for type, question or nonquestion. Questions included all utterances beginning with any Wh- form, those introduced by the copula is/are and other forms of the auxiliaries, and also included tag and negative questions as well as intonated interrogatives (↑). Intonated interrogatives included

statements as well as utterances with deleted initial auxiliaries all ending with rising intonation. (Examples are given in the results reported for Research Question II, p. 120) Nonquestions included all statements, exclamations, and imperatives which are hereafter reported as statements. All utterances types included single words as well as incomplete utterances all of which were assigned to a type.

Utterances were first analyzed into three types: statements, questions, and intonated interrogatives (↑). It was found that 21.8% of the total questions were intonated interrogatives. All four teachers used proportionately more intonated interrogatives than the two tutors and all adults used proportionately more intonated interrogatives for the play than for the story situation. Questions and intonated interrogatives were later collapsed into one utterance type, question.

Table 4 indicates that statements were proportionately greater than questions in 11 of 20 comparisons resulting in 57.3% statements and 42.7% questions for teacher utterances and in 17 of 20 comparisons or 63.5% statements and 36.5% questions for tutor utterances. Statements comprised 60.9% and questions 39.1% of the total number of utterances for all adults. While the tutors asked 4.4% more questions than the teachers, they uttered 10.8% more statements; therefore, even though the tutors asked more questions, the proportion of questions to statements was lower than that of the teachers.

Child Utterances

Non Adjacent Utterances. Child intelligible utterances totaled 2,575 and were analyzed first into two categories, those which were adjacent to an adult's preceding utterance and those which were

Table 4
Frequency and Percentage of Teacher and Tutor Utterances Analyzed as Statements and Questions by Child and Situation

(N=5,736)[a]

Teacher	Child	MLU[b] Group	Situation	Teacher Utterances: Statements f	Statements %	Questions f	Questions %	Total f	Total %
T-II	Art	Ia	Play	83	59.7	56	40.3	139	100
			Story	87	69.0	39	31.0	126	100
T-II	Kathy	Ia	Play	108	65.1	58	34.9	166	100
			Story	66	76.7	20	23.3	86	100
T-II	Iris	Ia	Play	113	65.3	60	34.7	173	100
			Story	101	70.6	42	29.4	143	100
T-I	Betty	Ib	Play	63	45.3	76	54.7	139	100
			Story	47	68.1	22	31.9	69	100
T-I	Randy	Ib	Play	94	51.4	89	48.6	183	100
			Story	24	38.7	38	61.3	62	100
T-I	Martin	Ib	Play	63	57.3	47	42.7	110	100
			Story	56	51.4	53	48.6	109	100
T-IV	Valerie	II	Play	78	50.3	77	49.7	155	100
			Story	56	52.8	50	47.2	106	100
T-III	Debbie	II	Play	43	37.1	73	62.9	116	100
			Story	55	62.5	33	37.5	88	100
T-I	Sally	II	Play	79	63.2	46	36.8	125	100
			Story	31	38.8	49	61.2	80	100
T-III	Danny	II	Play	82	59.9	55	40.1	137	100
			Story	41	51.3	39	48.7	80	100
			$\bar{X}$ f	1,370		1,022		2,392	
			$\bar{X}$ %		57.3		42.7		100

Tutor	Child	MLU[b] Group	Situation	Tutor Utterancer: Statements f	Statements %	Questions f	Questions %	Total f	Total %
Tu-A	Art	Ia	Play	68	64.2	38	35.8	106	100
			Story	55	64.0	31	36.0	86	100
Tu-A	Kathy	Ia	Play	178	74.5	61	25.5	239	100
			Story	105	67.7	50	32.3	155	100
Tu-A	Iris	Ia	Play	157	60.2	104	39.8	261	100
			Story	93	64.1	52	35.9	145	100
Tu-A	Betty	Ib	Play	183	74.1	64	25.9	247	100
			Story	63	70.8	26	29.2	89	100
Tu-A	Randy	Ib	Play	165	72.7	62	27.3	227	100
			Story	92	61.7	57	38.3	149	100
Tu-A	Martin	Ib	Play	119	64.7	65	35.3	184	100
			Story	90	62.5	54	37.5	144	100
Tu-B	Valerie	II	Play	120	46.9	136	53.1	256	100
			Story	48	50.0	48	50.0	96	100
Tu-B	Debbie	II	Play	128	57.9	93	42.1	221	100
			Story	37	50.0	37	50.0	74	100
Tu-A	Sally	II	Play	91	59.5	62	40.5	153	100
			Story	76	67.3	37	32.7	113	100
Tu-B	Danny	II	Play	194	64.7	106	35.3	300	100
			Story	62	62.6	37	37.4	99	100
			$\bar{X}$ f	2,124		1,220		3,344	
			$\bar{X}$ %		63.5		36.5		100

[a] N = 5,736 (2,392 Teacher Utterances and 3,344 Tutor Utterances)

[b] MLU Group: Ia = MLU 1.25-1.46
Ib = MLU 1.55-1.65
II = MLU 1.87-2.46

nonadjacent. A child utterance which occurred in a cluster[1] was counted as adjacent if it was contingent on the preceding adult utterance and nonadjacent if it was considered to be either noncontingent on the adult utterance or contingent on the first child utterance in the cluster. Immediate self-repetitions in which no adult utterance appeared between the child's utterance and his immediate self-repetition were coded as a subcategory of nonadjacent utterances. A mean of 3.4% of the utterances were coded Repeat Self Immediately with immediate self-repetitions later included in the major category of Imitation/Repeat self (I/Rs) for purposes of analyzing adult reactions.

There were 351 nonadjacent utterances, excluding immediate self-repetitions, for 13.6% of the total. Of the nonadjacent utterances, 75 or 21.4% were elicited by adult actions while 276 were elicited by neither adult actions nor utterances. For the six children in Group I, 42.5% of their nonadjacent utterances were actually in response to adult actions while only 19.8% of the nonadjacent utterances of the four children in Group II were to adult actions.

Adjacent Utterances. The children responded to 32.2% of all adult statements and 45.1% of all adult questions with intelligible adjacent utterances. Of the 2,575 intelligible child utterances, 2,136 or 83.0% were adjacent to adult utterances and for purposes of analysis were considered as child responses which were classified in one of five mutually exclusive categories based on an adaptation of the discourse analysis outlined by Bloom, Rocissano, and Hood (1976). (See Appendix I

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[1]An utterance cluster consists of more than one utterance spoken by one speaker during one turn with no time allowed between utterances for the listener to respond.

for definitions and examples of child discourse categories.) The categories were Imitation (I), Repeat self (Rs), Linguistically Contingent (LC), Contextually Contingent (CC), and Non Contingent (NC).

Imitations repeated part or all of an adult's preceding utterance without the addition of a word(s). An utterance was also counted as imitative if it changed the verb tense or the morphological ending of a word, changed a verb to a repetitive, i.e. from "The boy is walking" to "boy walk walk," or changed the intonation pattern, i.e. from "A half minute longer" to "longer↑". An utterance was classified as imitative if there were three or fewer utterances between the adult model and the child imitation. Utterances were coded as Repeat self if the child simply repeated his own preceding utterance following an adult utterance. Linguistically Contingent utterances shared the same topic and the same or subordinate verb relation as the preceding adult utterance. Contextually Contingent utterances shared the same topic but not the same verb relation as the preceding adult utterance while Non Contingent utterances did not share the adult topic.

In Table 5 are presented the Adjacent utterances for the two major groups of children (Group I, MLU 1.25-1.65; Group II, MLU 1.87-2.46). Each child utterance was analyzed according to category and whether it followed an adult statement or question.

Imitations occurred more than five times (5.4) as often after adult statements as after questions while linguistically contingent utterances occurred almost four times (3.7) as often after adult questions as after statements. When protocols were examined for individual children, it was found that although there was variation in absolute frequencies among children, each child responded more often to statements with imitations

Table 5
Frequency and Percentage of Adjacent Utterances Following Adult Statements (S) and Questions (Q) for Group I (MLU 1.25-1.65) and Group II (MLU 1.87-2.46) Children

(N = 2,136)[a]

Group	n	Imitation				Repeat Self				Linguistically Contingent				Contextually Contingent				Non Contingent				Total			
		S		Q		S		Q		S		Q		S		Q		S		Q		S		Q	
		f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
I	1,180	506	42.9	84	7.1	65	5.5	53	4.5	60	5.1	264	22.4	44	3.7	56	4.7	33	2.8	15	1.3	708	60.0	472	40.0
II	956	174	18.2	41	4.3	34	3.5	39	4.1	112	11.7	372	38.9	62	6.5	59	6.2	34	3.6	29	3.0	416	43.5	540	56.5
	f	680		125		99		92		172		636		106		115		67		44		1,124		1,012	
$\bar{x}$	%		31.8		5.8		4.6		4.3		8.0		29.8		4.9		5.4		3.1		2.1		52.6		47.4

[a] N = 2,136 (2,575 total intelligible utterances less 439 nonadjacent and immediate self repetitions)

and to questions with linguistically contingent utterances. Variations were greater for linguistically contingent (LC) responses. The child with the lowest MLU did not give LC responses to any statements while more than one-third of the LC responses of the child with the highest MLU were to statements. For contextually contingent utterances there was a slightly greater proportion of responses to questions than to statements for overall responses. However protocols for individual responses revealed a different pattern for one child. Sally, who was severely rather than profoundly hearing impaired and whose MLU was 2.45, responded with contextually contingent (CC) utterances more often to adult statements than to adult questions. Therefore, mean responses for nine children for CC utterances were 42.9% to statements and 57.1% to questions while Sally's were 64.1% to statements and 35.9% to questions.

In Table 6 are displayed frequencies and percentages of responses of individual children by session. Figure 4 shows the proportional distribution of utterances by the two major groups of children. There were striking differences in the proportions of linguistically contingent and imitative utterances by the two groups with 1.8 times as many imitations as linguistically contingent utterances by the children with lower MLU and 2.3 times as many linguistically contingent responses as imitations by the children with higher MLU.

Summary and Conclusions

Although there were indications that both stimuli and person interacting with the child influenced amount and length of child utterances, a greater influence appeared to be the linguistic ability of the child. The adults in turn reacted to these individual abilities as reflected by differences in adult MLU and in their use of single words. All

Table 6
Frequency and Percentage of Categories[a]
of Child Utterances by Child per Session
(N = 2,575)

Child	Session[b]	MLU[c] Group	I		Re		LC		CC		NC		NA		Total	
			f	%	f	%	f	%	f	%	f	%	f	%	f	%
Art	T-II	Ia	61	67.0	8	8.8	12	13.2	7	7.7	1	1.1	2	2.2	91	100
	Tu-A		44	47.3	13	14.0	12	12.9	7	7.5	-	-	17	18.3	93	100
Kathy	T-II	Ia	56	70.0	3	3.8	16	20.0	-	-	4	5.0	1	1.2	80	100
	Tu-A		93	58.1	25	15.6	24	15.0	4	2.5	4	2.5	10	6.3	160	100
Iris	T-II	Ia	43	45.3	17	17.9	19	20.0	10	10.5	5	5.3	1	1.0	95	100
	Tu-A		76	52.4	14	9.6	39	26.9	10	6.9	3	2.1	3	2.1	145	100
Betty	T-I	Ib	4	13.8	4	13.8	11	37.9	5	17.2	-	-	5	17.2	29	100
	Tu-A		35	34.3	23	22.6	22	21.6	9	8.8	4	3.9	9	8.8	102	100
Randy	T-I	Ib	15	12.4	13	10.7	59	48.8	15	12.4	4	3.3	15	12.4	121	100
	Tu-A		50	29.1	21	12.2	47	27.3	14	8.1	16	9.3	24	14.0	172	100
Martin	T-I	Ib	37	42.5	12	13.8	20	23.0	9	10.3	3	3.5	6	6.9	87	100
	Tu-A		76	44.4	18	10.5	43	25.2	10	5.9	4	2.3	20	11.7	171	100
Valerie	T-IV	II	34	27.6	12	9.8	63	51.2	7	5.7	3	2.4	4	3.3	123	100
	Tu-B		35	24.8	14	9.9	74	52.5	12	8.5	1	0.7	5	3.6	141	100
Debbie	T-III	II	9	11.8	6	7.9	41	54.0	8	10.5	6	7.9	6	7.9	76	100
	Tu-B		21	20.0	8	7.6	58	55.2	5	4.8	4	3.8	9	8.6	105	100
Sally	T-I	II	12	6.1	6	3.1	72	36.5	28	14.2	7	3.6	72	36.5	197	100
	Tu-A		47	23.3	17	8.4	49	24.2	25	12.4	9	4.5	55	27.2	202	100
Danny	T-III	II	22	11.6	27	14.2	52	27.4	12	6.3	22	11.6	55	28.9	190	100
	Tu-B		35	18.0	18	9.2	75	38.5	24	12.3	11	5.6	32	16.4	195	100
		f	805		279		808		221		111		351		2,575	
		$\bar{X}$ %		31.3		10.8		31.4		8.6		4.3		13.6		100

[a]Categories of Child Utterances

I = Imitate
Re = Repeat Self Including Immediate Self Repetitions
LC = Linguistically Contingent
CC = Contextually Contingent
NC = Noncontingent
NA = Nonadjacent

[b]T = Teacher
Tu = Tutor

[c]MLU Group:
Ia = MLU 1.25-1.46
Ib = MLU 1.55-1.65
II = MLU 1.87-2.46

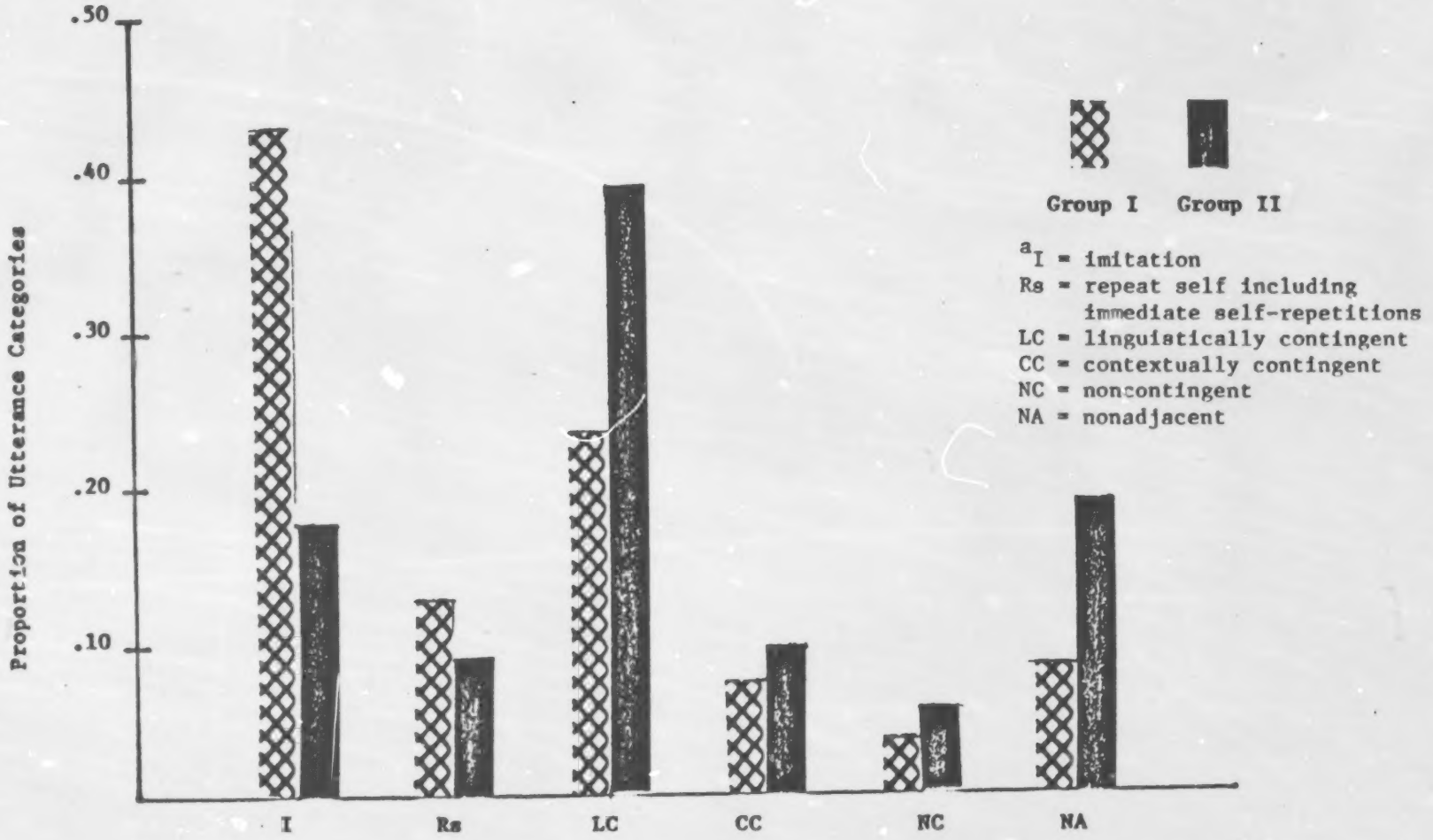

FIGURE 4. Proportional Distribution of Categories[a] of Child Utterances for Group I and Group II

children responded more to adult questions with linguistically contingent utterances and to statements with imitations with differences between the child MLU groups for overall proportions of imitative and linguistically contingent responses. Therefore, stimuli were combined for further analyses with individual adult and child differences reported when relevant.

Topic-Related Child Discourse

Topic-related discourse, contingent and imitative speech, was analyzed for all of the children. Linguistically and contextually contingent utterances were subcategorized according to type and form of contingency, and imitative speech was analyzed according to the portion of the preceding adult utterance imitated and the major semantic-syntactic relation of the adult utterance imitated. (See Appendix H for semantic-syntactic categories.) Table 7 displays the proportions of child utterances in categories of topic-related discourse. Neither self-repetitions following adult utterances nor immediate self-repetitions have been included. Topic-related discourse comprised 71.3% of all speech for the ten children with a range from 57.1% to 85.2% for individual children. The two children with the highest proportion of nonadjacent speech had the lowest proportion of topic-related speech.

Proportional distributions for the three topic-related categories were similar for teacher and tutor sessions for six of the children. For the other four children, the increase in imitations with their tutors resulted in concomitant changes in proportions of contingent utterances.

Linguistically Contingent Child Utterances

Linguistically contingent utterances were related by topic to the preceding adult utterance and either preserved the same verb relation

Table 7
Proportion of Child Utterances in Categories
of Topic - Related Discourse

(N = 1,834)[a]

				Linguistically Contingent								Contextually Contingent					Imitation
		MLU[b]						Request									
Child	Session	Group	n[c]	Yes/No	Recode	Alternative	Choice	Expand	Clairfy	Other	Total	Alternative	Expand	Other	Undetermined	Total	
Art	T-II	Ia	80	-	-	.01	-	.14	-	-	.15	-	.09	-	-	.09	.76
	Tu-A		63	-	-	-	.02	.17	-	-	.19	-	.05	-	.06	.11	.70
Kathy	T-II	Ia	72	.01	-	.01	-	.19	-	-	.21	-	-	-	-	-	.78
	Tu-A		121	-	-	.02	.01	.17	-	-	.20	-	.03	-	-	.03	.77
Iris	T-II	Ia	72	-	-	.01	.01	.24	-	-	.26	.01	.13	-	-	.14	.60
	Tu-A		125	.03	-	-	.02	.26	-	-	.31	-	.08	-	-	.08	.61
Betty	T-I	Ib	20	.05	-	-	05	.45	-	-	.55	.10	.15	-	-	.25	.20
	Tu-A		66	.08	-	.01	-	.24	-	-	.33	-	.14	-	-	.14	.53
Randy	T-I	Ib	89	.33	.01	.02	-	.16	.13	.01	.66	.06	.10	-	.01	.17	.17
	Tu-A		111	.16	.01	.04	.01	.18	.02	-	.42	.03	.10	-	-	.13	.45
Martin	T-I	Ib	66	.08	-	.01	.01	.20	-	-	.30	-	.09	-	.05	.14	.56
	Tu-A		129	.07	-	.01	.01	.24	-	-	.33	.01	.07	-	-	.08	.59
Valerie	T-IV	II	104	.29	-	.06	-	.26	-	-	.61	-	.07	-	-	.07	.32
	Tu-B		121	.07	.01	.06	.02	.45	-	.01	.61	-	.10	-	-	.10	.29
Debbie	T-III	II	58	.31	-	-	.02	.17	.21	-	.71	-	.12	.02	-	.14	.15
	Tu-B		84	.10	-	.02	.02	.54	-	.01	.69	-	.06	-	-	.06	.25
Sally	T-I	II	112	.27	-	.03	.01	.26	.06	.01	.64	.04	.18	.03	-	.25	.11
	Tu-A		121	.05	.02	.02	.01	.28	.02	.01	.41	-	.19	.01	.01	.21	.39
Danny	T-III	II	86	.23	.07	.06	-	.22	.02	-	.59	.01	.13	-	-	.14	.26
	Tu-B		134	.12	.01	.07	.01	.34	.01	-	.56	.01	.15	.01	.01	.18	.26
											.44					.12	.44

[a]N = 1,834 utterances (2,575 less noncontingent, nonadjacent, and self repetitions)

[b]MLU Group: IA = MLU 1.25-1.46
Ib = 1.55-1.65
II = MLU 1.87-2.46

[c]n = number of contingent and imitative utterances for each child during teacher (T) and tutor (Tu) sessions.

or added a subordinate verb relation.

Subcategories of Linguistically Contingent Speech. There were eight subcategories of linguistically contingent (LC) speech: yes/no, recode, alternative, choice, expansion, clarification request, and other. (See Appendix I for definitions and examples of subcategories of LC speech.)

The majority of the LC utterances were expansions of the preceding adult utterance for all children with the exception of one child in Group I. His LC responses were 32.1% expansions and 44.3% yes/no replies. An average of 82.0% of the LC utterances of the other five children in Group I and 54.5% of those of Group II were expansions. In LC expansions the child added information to the adult's preceding utterance within the same clause structure and with the same or subordinate verb relation.

In Figure 5 is shown the proportional distribution of the types of LC expansions for the two groups of children. Nonspecified noun/attribute replacements were similar for both groups of children (Group I: 12.9%; Group II: 11.0%); therefore, specified and nonspecified Wh- replacements were included in the major type Wh-replacement: noun/attribute. Children with lower MLU (Group I) gave more noun/attribute and different relation responses than children in Group II who in turn gave more verb replacements and constituent modifications/additions than did the children in Group I. Noun/attribute replacements were 1.3 times as frequent as verb replacements for Group II while the proportion of noun/attribute to verb replacements was four times greater for Group I.

Form of Linguistically Contingent Speech. When the form of linguistic contingency was examined, differences were most apparent among children within three MLU ranges: three children with MLU 1.25-1.46; five children

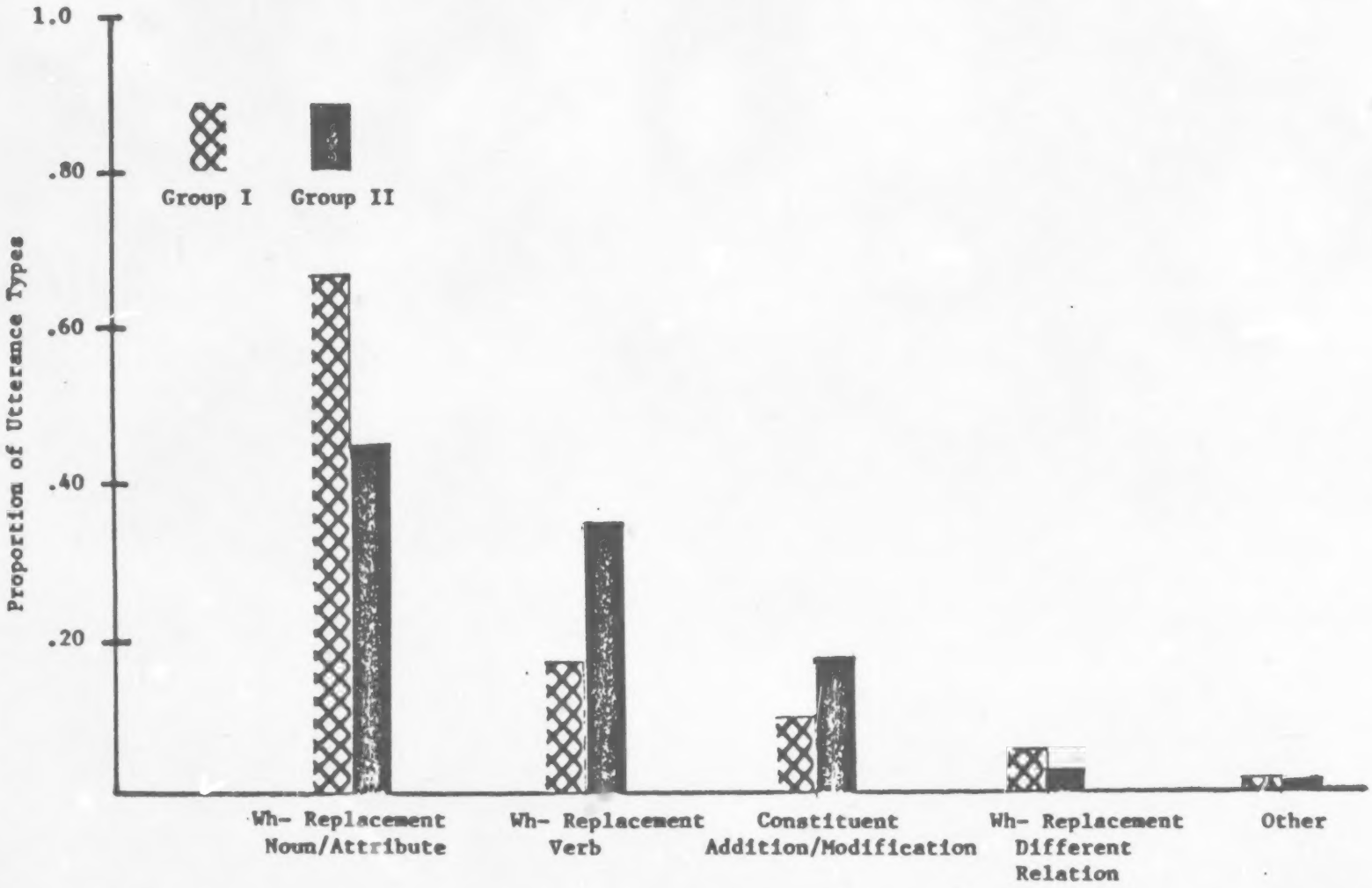

FIGURE 5. Proportional Distribution of the Types of Linguistically Contingent Expansions for Group I and Group II

with MLU 1.55-2.17, and the two children with MLU 2.45 and 2.46. Form included the eight categories of Yes/No, Repeat, Add Word/Phrase, Add Sentence, Repeat and Add, Recode/Recode and Repeat, Recode and Add, and Recode and Repeat and Add. (See Appendix I for definitions and examples of LC form categories.)

Figure 6 displays the proportional distribution of the forms of LC utterances by range of MLU. Yes/No replies, which included other forms of acknowledgment and negation, were similar for the children with an MLU range of 1.55-2.17 (26.9%) and 2.45-2.46 (26.6%) while comprising only 4.1% of the LC utterances for the children with the lowest MLU (1.25-1.46). Results of an analysis of individual responses showed that the child with the lowest MLU gave neither oral nor nonoral responses to yes/no questions. Rather, he imitated yes/no and intonated questions more than three times as often as Wh- questions. The child with the second lowest MLU gave minimal yes/no responses, imitated yes/no and intonated questions more than three times as often as Wh- questions and several times accompanied her imitations of yes/no questions with a head shake which was interpreted by the adult as a denial of the question. In addition, both children differentiated between equivocal and unequivocal yes/no questions by not imitating those which requested specific answers as opposed to those which requested verification/denial. Implications for intervention based on possible beginning response strategies to yes/no questions will be examined in the discussion chapter.

Repeat utterances were those in which the child either repeated one of an alternative when given a choice by the adult or when the word repeated by the child became the first word in a series of single word utterances. Repeat utterances of the preceding types were not coded

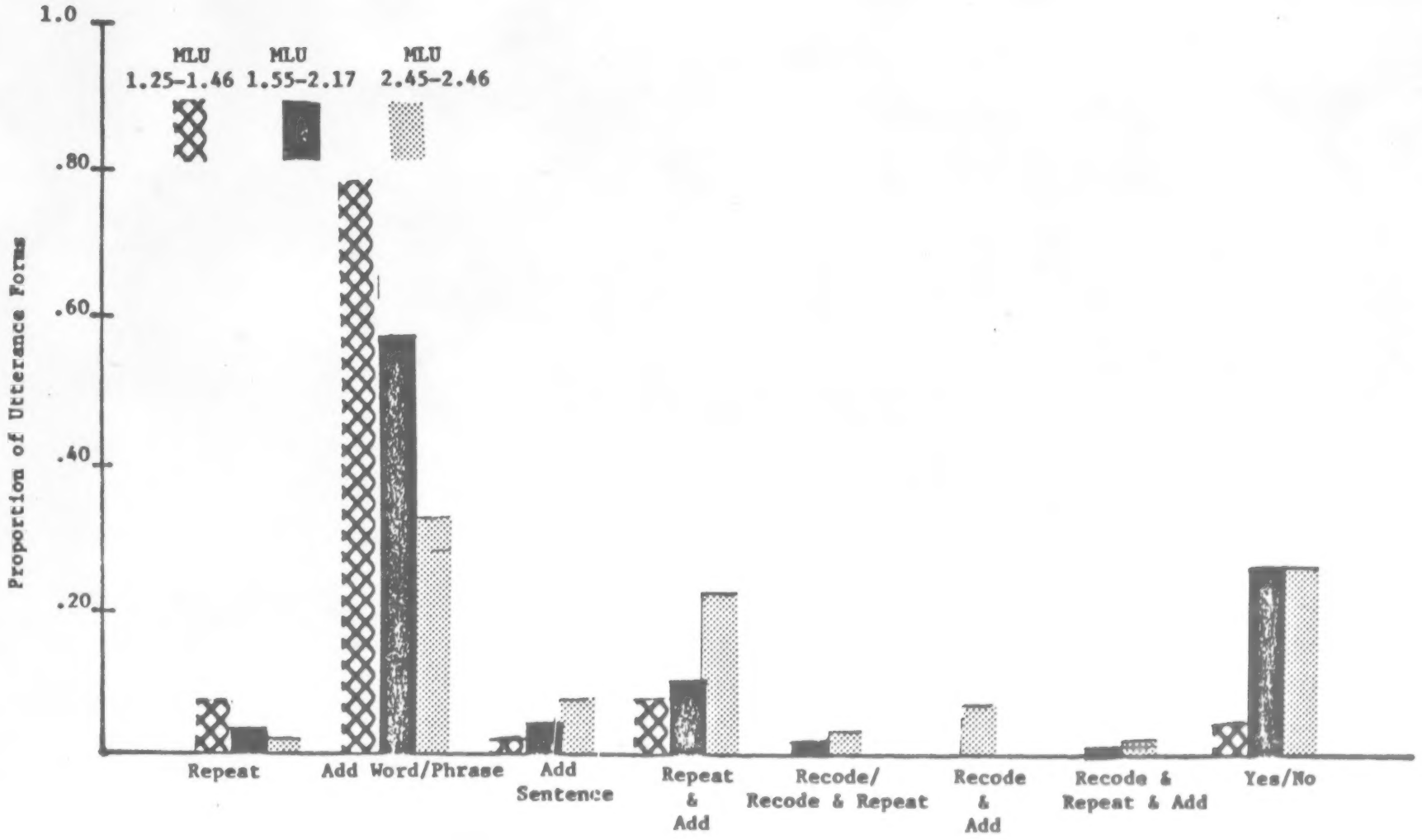

FIGURE 6. Proportional Distribution of the Forms of Linguistic Contingency for Children by Range of Mean Length of Utterance (MLU)

as imitations but as linguistically contingent. As expected, there were more Repeat utterances by the children with the lowest MLU (1.25-1.46) than by the other children.

For all children the most frequent form of LC speech was a word or phrase that either added or replaced a constituent in the adult utterance, Add Word/Phrase. The second most frequent form for the children with the lowest MLU consisted of a repetition of part of the adult utterance with the addition of a word or phrase in the adult utterance, Repeat and Add. For the other children, Repeat and Add utterances were the third most frequent, following Add Word/Phrase and Yes/No, and comprised 21.8% of the total number of LC utterances for the two children with the highest MLU.

Utterances in which a noun or pronoun in the adult utterance was recoded or recoded and other lexical items repeated, Recode/Recode and Repeat, were few comrising less than 2.0% of the LC responses and used by only four of the children. Utterances which included recodings and additions, Recode and Add, were used only by the two children with highest MLU and comprised 6.4% of their LC utterances. Finally, three of the children began to show evidence of Recode, Repeat, and Add. The low proportions of recodings in any form suggests the difficulty of pronoun use by the children.

When the two children with the highest MLU repeated part of the adult utterance and added to it, they repeated the verb or locative adverb or preposition 50% of the time. The children with an MLU from 1.55 to 2.17 repeated the verb or locative adverb or preposition 32.6% of the time while these forms were never repeated by the three children with the lowest MLU. When the children recoded and repeated or recoded, repeated, and added, they repeated the verb 75% of the time. However, there were few instances

of either of the latter forms.

Contextually Contingent Child Utterances

Contextually contingent speech comprised 8.6% of all child speech and 12.0% of child topic-related utterances. Means ranged from 1.6% to 22.8% for individual children for topic-related speech that was contextually contingent. Contextually contingent (CC) responses preserved the topic of the adult utterance by either expanding on or presenting an alternative to the idea in the adult utterance with a different verb relation. Subcategories were coded as alternative, expansions, other, or undetermined. (See Appendix I for definitions and examples of subcategories of CC speech.) One-third of all contextually contingent utterances occurred as semantically inappropriate responses to adult requests.

Figure 7 displays the proportional distribution of the forms of contextually contingent utterances for the three MLU groupings of 1.25-1.46, 1.55-2.17, and 2.45-2.46. The three categories of Yes/No, Repeat, and Recode/Recode and Repeat were omitted from linguistically contingent utterances and a comparison is shown in Table 8 of the proportional distribution of forms for both linguistically and contextually contingent utterances within and across the three MLU ranges. The predominant form of contingent response was Add Word/Phrase with Repeat and Add responses infrequent with the exception of LC utterances for the two children with the highest MLU who repeated and added almost twice as often for LC as for CC utterances.

Imitation

The following three factors led to a close examination of imitative utterances: (1) imitation as a teaching strategy frequently used in the

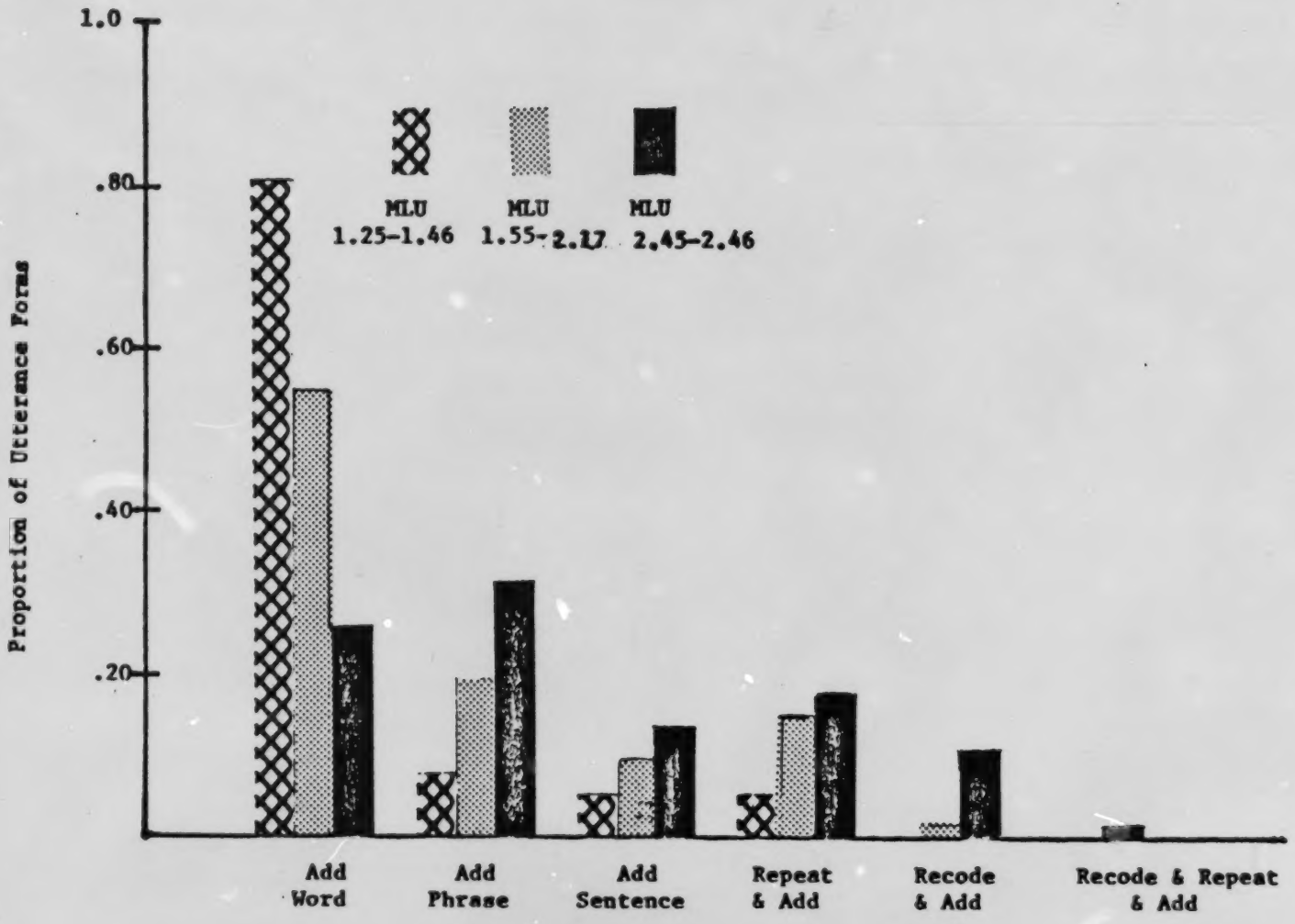

FIGURE 7. Proportional Distribution of the Forms of Contextual Contingency for Children by Range of Mean Length of Utterance (MLU)

Table 8

Proportional Distribution of the Form of Linguistically (LC) and Contextually Contingent (CC) Utterances for Children with MLU 1.25–1.46, 1.55–2.17, and 2.45–2.46

MLU Range	Contingent Category	Add Word/ Phrase	Add Sentence	Repeat & Add	Recode & Add	Recode & Repeat & Add
1.25–1.46	LC	.91	.01	.08	-	-
	CC	.90	.05	.05	-	-
1.55–2.17	LC	.81	.04	.14	-	.01
	CC	.74	.10	.15	-	-
2.45–2.46	LC	.47	.10	.32	.10	.02
	CC	.57	.13	.18	.11	.01

instruction of hearing impaired children; (2) conflicting reports in the literature of the efficacy of imitation as a language learning strategy; and (3) the finding in the present study of a high proportion of imitative speech with a range of differences among children while only 10.0% of all adult utterances were either direct or indirect requests for imitation.

Overall, imitative speech was as frequent as linguistically contingent speech, each comprising 44.0% of topic-related utterances and 31.0% of total child speech. Imitations ranged from 20% to 77% of topic-related child utterances and from 15% to 57% of total child utterances for individual children. Means were 70.0% of topic-related and 56.2% of total speech for Group Ia, 45.1% and 31.8% for Group Ib respectively, and 26.2% and 17.5% for Group II.

Portion of Adult Utterance Imitated. When imitative utterances were examined, it was evident that the portion of the adult utterance imitated varied and that there were differences between Group I and Group II children concerning the proportional distribution of the position and type of lexical items imitated. Both groups tended to imitate only the immediately preceding adult utterance with less than 3% imitations of adult utterances within the three preceding utterances. Figure 8 presents the proportional distribution of the portion of the adult utterances imitated by Group I and Group II children. It was found when analyzing the part of the adult utterance imitated that all imitative utterances fell into one of seven types: Last Two Words of Utterance > Two Words, Entire Utterance > Three Words, Reduced Verb Relation, Selected Word(s), Single Word, Two-Word Utterance, and Last Word of Utterance > One Word. For all types, articles "the" and "a" and morphological endings were not counted when omitted by a child in his imitative utterance. If a

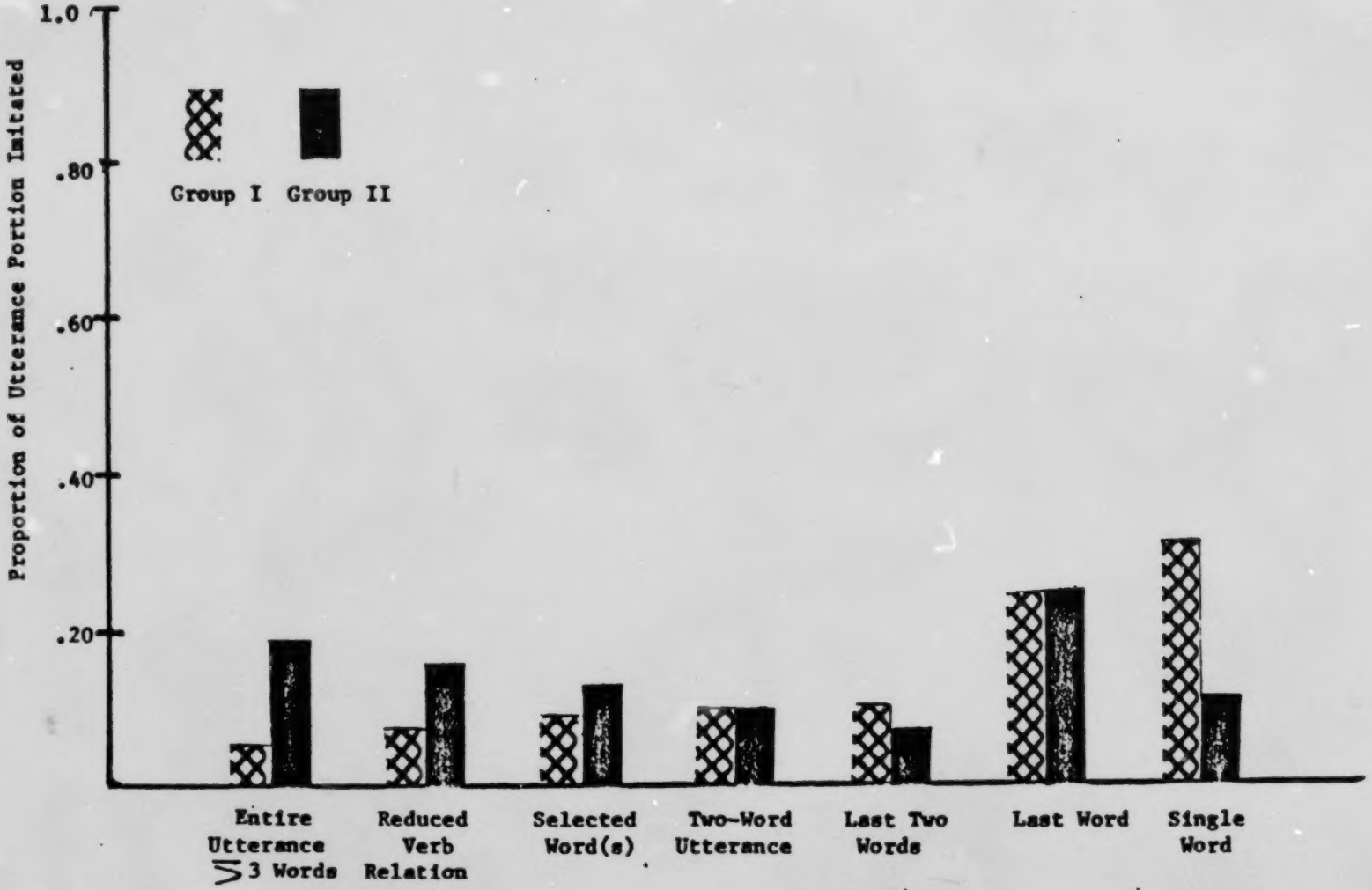

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FIGURE 8. Proportional Distribution of the Portion of Adult Utterances Imitated by Group I and Group II

child imitated "blue pant" for the adult utterance "The boy has blue pants," his utterance was coded as Last Two Words of Utterance > Two Words. If the child imitated "boy has blue pant," it was coded as Entire Utterance > Three Words.

Reduced Verb Relations were utterances in which the child imitated at least two of the three major constituents of subject-verb-object or subject-verb-place, for example: T-II said, "The lion jumped through the ring," and Iris imitated "jump ring." Tutor B questioned, "The boy and the dog are going home↑," and Val imitated "boy dog home." Tutor A said, "The boy opened the cage," and Kathy imitated "boy open."

Selected Word(s) did not necessarily imply communicative intent on the part of the child, rather an utterance was so coded if the lexical item(s) repeated did not occur at the end of the adult utterance. That is, the word(s) imitated were other than the last word or the last two words of the adult utterance, for example, Tu-A asked, "Did I open the cage?," and Kathy imitated "open." Teacher III asked, "Where do you think the boy and the dog are going?," and Danny imitated "dog the boy."

When the imitative utterance repeated an adult's single word utterance (SWU), a two-word utterance, or the last word in any utterance longer than one word, it was coded Single Word, Two-Word Utterance, and Last Word respectively.

Of the imitations for Group II, 48.4% were of Entire Utterance, Reduced Verb Relation, and Selected Word(s), while 22.6% of the imitations of Group I were of the above types. For both groups, the highest proportions were of Last Word while Group I imitated almost three times as many Single Words as did Group II. It was reported previously (p. 69) that single words were used proportionately more with lower MLU children.

Speech Correction. All imitative utterances were then analyzed according to the adult communicative intent of Speech Correction. All imitative child utterances for which the adult first repeated the child in attempts to improve speech were coded as Speech Correction. The children were encouraged through the adult's imitation to improve vocal intensity, phoneme production, or number of syllables. It was found that 13.7% of all imitative utterances for Group I and 1.9% for Group II were of this type. Utterances in which the adult encouraged imitation for purposes of adding grammatical morphemes or lexical items were not so coded. The latter were included in the previously reported analysis of total adult utterances and were coded Speech Emphasis (p. 74). Speech Emphasis also included utterances in which the adult gave any indication to the child to repeat and included, but was not limited to, the adult first repeating the child.

Semantic-Syntactic Relations. The remaining imitations were analyzed according to the major semantic-syntactic relation of the adult utterance imitated (adapted from Bloom, Lightbown, and Hood, 1975; see Appendix H for definitions of semantic-syntactic relations). The results are presented in Table 9 for frequencies and percentages and are ranked for each group of children. For the children with the lowest MLU, the focus for imitations was on names or identification of objects with locative action second while for the children with the higher MLU, the focus was on action and locative action events.

Child Initiated Imitations. All imitative utterances were lastly examined to detemine the percentage of child initiated utterances, that is, any utterance in which one or more content words had originated in a previous child utterance during the same session. Of the imitative

Table 9

Frequency, Percentage, and Rank of the Major Semantic-Syntactic Relations of the Adult Utterance Imitated by Group I and Group II

Group I (N = 509)				Group II (N = 211)			
Semantic Syntactic Relation	Rank	f	%	Semantic-Syntactic Relation	Rank	f	%
Existence/Identity	1	140	27.5	Action	1	39	18.5
Locative Action	2	85	16.7	Locative Action	2	36	17.1
State	3	76	14.9	Existence/Identity	3	35	16.6
Action	4	56	11.0	State	4	31	14.7
Attribution	5	51	10.0	Attribution	5	27	12.8
Locative State	6	27	5.3	Locative State	6	22	10.4
Sounds	7	21	4.1	Possession	7	8	3.8
Social	8	17	3.3	Negation/Completion	8	6	2.8
Negation/Completion	9	16	3.1	Social	9	3	1.4
Possession	10	12	2.4	Sounds	10	2	0.9
Recurrence	11	5	1.0	Recurrence	11	1	0.5
Affirmation	12	3	0.6	Affirmation	11	1	0.5

utterances for Group I, 26.3% were child initiated while 48.4% of those of Group II were child initiated. All child initiated imitations were then analyzed to determine the adult reaction and the child subsequent response. Results indicated that when imitative utterances were originally child initiated, the adults expanded 75% of the imitations of Group I and 90% of those of Group II. When the adult reaction expanded the child imitation, the children in Group I added to their imitative utterance by selecting a lexical item(s) from the adult expansion 60.3% of the time while the children in Group II selected from the adult expansion 86.2% of the time.

Summary and Conclusions

To summarize the findings for child utterances in general as well as for topic-related child speech in particular, it was reported that child utterances that were nonadjacent to adult utterances comprised 13.6% while those that were adjacent but noncontingent comprised 4.3% of total child utterances with immediate self-repetitions omitted. This finding indicates that less than one-fifth of the children's speech was spontaneous. Topic-related child discourse, utterances that were contingent or imitative, made up 71.2% of the total child utterances. Therefore, the children were learning not only to speak when spoken to but to respond to the adult message. When considered with the low proportions of contextually contingent utterances reported for the children, these findings strongly suggest that language learning for these hearing impaired children was dependent upon the form of the adult input message to an extent not found with hearing children for whom much of language might be "overheard".

When imitations and linguistically contingent utterances were compared, it was found that all children responded differentially to questions and nonquestions with Group II children responding with proportionately twice as many linguistically contingent utterances as Group I while Group I children imitated adult utterances more than twice as often as did Group II. When they imitated, both groups of children imitated the immediately preceding adult utterance more than 97% of the time with the highest proportion of imitations for both groups the most recent adult word or words. Group II children, however, imitated selectively for almost 50% of their imitations and more than twice as often as did Group I. Additionally, the use of imitation by the two children with the lowest MLU indicates that imitation may be a beginning strategy for learning to engage in discourse. This will be explored further in the discussion chapter.

Adult Reactions

For purposes of analyzing adult utterances which followed and were adjacent to child utterance, child categories were collapsed into Imitation or Repeat self (I/Rs), Linguistically or Contextually Contingent (LC/CC), and Non Adjacent or Non Contingent (NA/NC). All adult utterances which succeeded and were adjacent to child utterances were designated as Adult Reactions. Table 10 displays the frequency and percentage of the three major categories of child total utterances (N = 2,575). The category of I/Rs includes immediate self-repetitions for this and subsequent analyses.

Table 10
Frequency and Percentage of Major Categories[a] of Child Total Utterances
(N = 2,575)

Child	MLU	I/Rs[b]		LC/CC		NA/NC		Total	
		f	%	f	%	f	%	f	%
Art	1.25	126	68.5	38	20.7	20	10.8	184	100
Kathy	1.37	177	73.8	44	18.3	19	7.9	240	100
Iris	1.46	150	62.5	78	32.5	12	5.0	240	100
Betty	1.55	66	50.4	47	35.9	18	13.7	131	100
Randy	1.57	99	33.8	135	46.1	59	20.1	293	100
Martin	1.65	143	55.4	82	31.8	33	12.8	258	100
Valerie	1.87	95	36.0	156	59.0	13	5.0	264	100
Debbie	2.17	44	24.3	112	61.9	25	13.8	181	100
Sally	2.45	82	20.6	174	43.6	143	35.8	399	100
Danny	2.46	102	26.5	163	42.3	120	31.2	385	100
	f	1,084		1,029		462		2,575	
	$\bar{X}$ %		42.1		40.0		17.9		100

[a]I/Rs = Imitate adult or repeat self.
LC/CC = Linguistically or contextually contingent.
NA/NC = Nonadjacent or Noncontingent.

[b]Includes immediate self repetitions.

Reaction/No Reaction

Adult reactions were analyzed according to whether or not an adult utterance followed each child utterance. Child utterances which occurred in clusters were counted as one turn and no adult reaction was possible until the completion of the turn. If no adult reaction occurred in a situation in which the adult had an opportunity to do so or did so nonorally, it was coded as No Reaction. Of the total possible reactions, only 8.1% were No Reactions. The highest proportion of No Reactions was given to the child with the lowest MLU by Tu-A who appeared to be using an action rather than a verbal strategy to elicit language with this child. In general however, the children with the highest proportion of spontaneous utterances (NA/NC) received the highest proportion of adult No Reactions.

Contingency

Each adult reaction was analyzed according to its contingency on the preceding child utterance and was placed in one of five mutually exclusive categories: Non Contingent (NC), Linguistically Contingent (LC), Contextually Contingent (CC), Self Contingent (SC), or Imitation (I). (See Appendix J for description of the discourse categories for the adult reactions.) Only the adult utterance immediately following a child utterance was so categorized although adult utterance cluster reactions were later included in the analysis of Child Subsequent Responses (CSR).

Self Contingent (SC) utterances were those in which: (1) the child either imitated the adult and in the SC utterance the adult did not acknowledge the imitation but answered her own question, repeated herself, or continued on her own topic preserving the verb relation; or (2) the

child answered the adult and the adult repeated her own utterance or used an attention getting verbal device to call the child's attention to the adult topic. The SC behavior was seen consistently in reaction to child imitations with fewer instances in reaction to other child utterance categories.

Imitations (I) were similar to child imitations with the exception that if the adult repeated the child and changed the intonation pattern, it was not coded as an imitation but Linguistically Contingent. It was assumed that the adult changed the intent of the utterance by adding rising intonation; therefore, only when an adult imitated a child question was it designated a question. Consequently, most adult imitations were in the form of statements. Adult utterances were considered imitations if they repeated the child partially or wholly or added an article or word ending or completed the word, for example:

Child: monk/

Adult: monkey (or) a monkey (or) monkeys

All three of the above reactions would have been coded Imitation but not:

Child: monk/

Adult: It's a monkey. (or) You like monkeys.

Acknowledgments in any form were considered to be Linguistically Contingent as were clarification requests.

Adult reactions to combined categories of child utterances averaged 46.7% linguistically contingent, 17.0% contextually contingent, 13.2% self contingent, 12.4% imitation, 8.1% no reaction (NR), and 2.6% noncontingent. Adult reactions to major categories of child utterances were analyzed for Group I and Group II children and the results are

presented in Figure 9. Group I children were imitated more than those in Group II regardless of category of child utterance and Contextually Contingent and No Reactions were more frequent with Group II children. Linguistically Contingent utterances were the most frequent reactions to both groups for all categories. Regardless of child utterance category, the adults most frequently gave an LC reaction that either expanded the child's single word utterance; used the same or subordinate verb relation as in the child utterance; or acknowledged, reinforced, or questioned the child utterance. Reactions that changed the topic, Non Contingent, while more frequent with Group II children, were few and never accounted for more than 6.7% of the reactions to any Group II child or 2.2% to any Group I child.

It was expected that the adults might imitate the children who imitated more. This proved to be the case in that the children in Group I with higher proportions of imitations than those in Group II were imitated from three to five times more frequently than those in Group II. However child imitations were not imitated more for a greater number of NA/NC child utterances were imitated by each adult than any other category or child utterances for Group I children.

Questions/Statements

Of teacher reactions, 61.3% were statements and 38.7% questions while 71.9% of the tutor reactions were statements and 28.1% questions. Adult reaction statements and questions were compared to total proportions of statements and questions. Only in three sessions with Group II children did individual adults use questions as reactions proportionately more than they used questions overall. In most cases the proportions were similar. In three sessions with Group Ia children, questions were

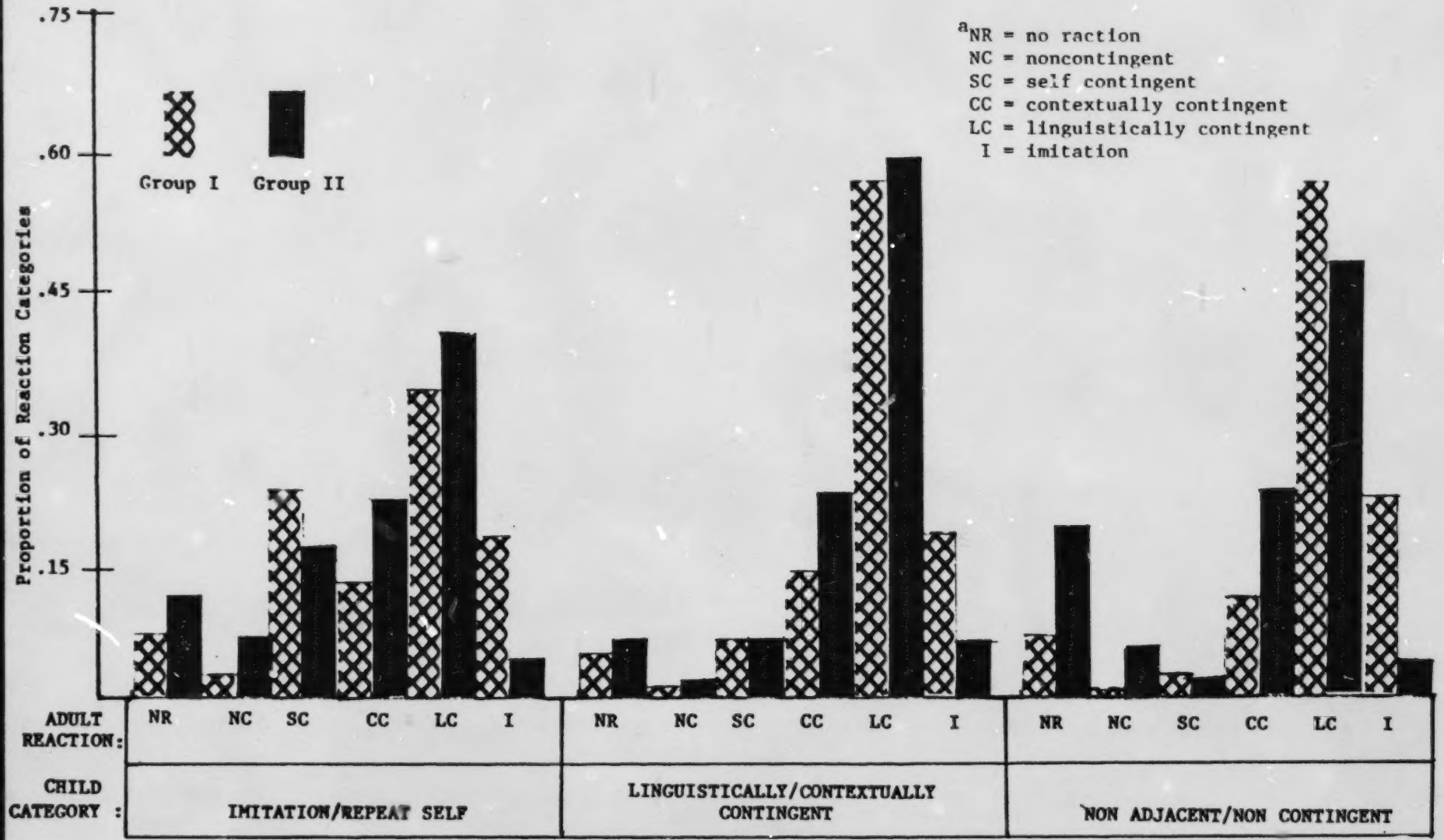

FIGURE 9. Proportional Distribution of Categories[a] of Adult Reactions to Major Categories of Child Utterances for Group I and Group II

asked proportionately two to three times more in total protocols than as reactions.

When contingency of adult reactions was examined for questions and statements, only Non Contingent reactions showed a higher proportion of questions than statements for all adults combined indicating that the adults more often used a question to introduce a new topic. Individual differences, however, were evident for each contingent category with the exception of Linguistically Contingent reactions which were proportionately more in the form of statements than questions by the two tutors with all ten children.

Repeat/Not Repeat

Adult reactions were analyzed according to whether they repeated or did not repeat any part of the child's previous utterance. Although there were individual differences among adults and across children, in general I/Rs child utterances were as likely to be repeated as not repeated while NA/NC and LC/CC utterances were more likely to be repeated than not repeated by the adults.

When reaction statements and questions were examined for proportions of utterances which repeated and did not repeat, it was found that in general adult reactions which repeated all or part of a child utterance were more likely to be statements. Adult utterances which did not repeat any part of the child's preceding utterance were more variable with a higher proportion of questions than for reactions which repeated the child's utterance.

Adult reactions were further analyzed for form with repetitions subcategorized according to whether they repeated only or repeated and expanded the child utterance in any way. The latter may or may not have

been categorized as imitations. Imitations by adults could, by definition, include the addition of certain elements as previously described in the contingency section (p. 102). Nonrepetitions were subcategorized as utterances neither recoded nor repeated and as those which recoded but did not repeat the child utterance, for example:[1]

(Debbie reaching in airphane,
taking out peg doll)

T-III: Oh look, who's that?
boy/
What's he doing? (Recode)

Results indicated differences between the two groups for reactions which repeated since there were three times as many repeat only reactions to the children with lower MLU than to Group II. Repeat and expand reactions were proportionately similar to both groups.

Figure 10 displays the proportional distribution of the form of adult reactions to major categories of child utterances for the two groups of children. Reactions which neither repeated nor recoded were given proportionately more to I/Rs utterances for both groups of children. Reactions which repeated only the child utterances were given two to four times more to Group I than to Group II children although proportions were lowest for this category. Repeat and expand reactions were given proportionately more to NA/NC utterances with I/Rs utterances the only category for which repeat and expand reactions were given proportionately more to Group II than to Group I children. When individual adult reactions

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[1]Utterances on the right were spoken by the child and those on the left by the adult. Information of the left in parentheses describes the context. Child utterances begin with lower case letters with utterance boundaries indicated by a slash (/) with the exception of Wh- questions for which a question mark (?) is used and rising intonation utterances which end with a rising arrow (↑).

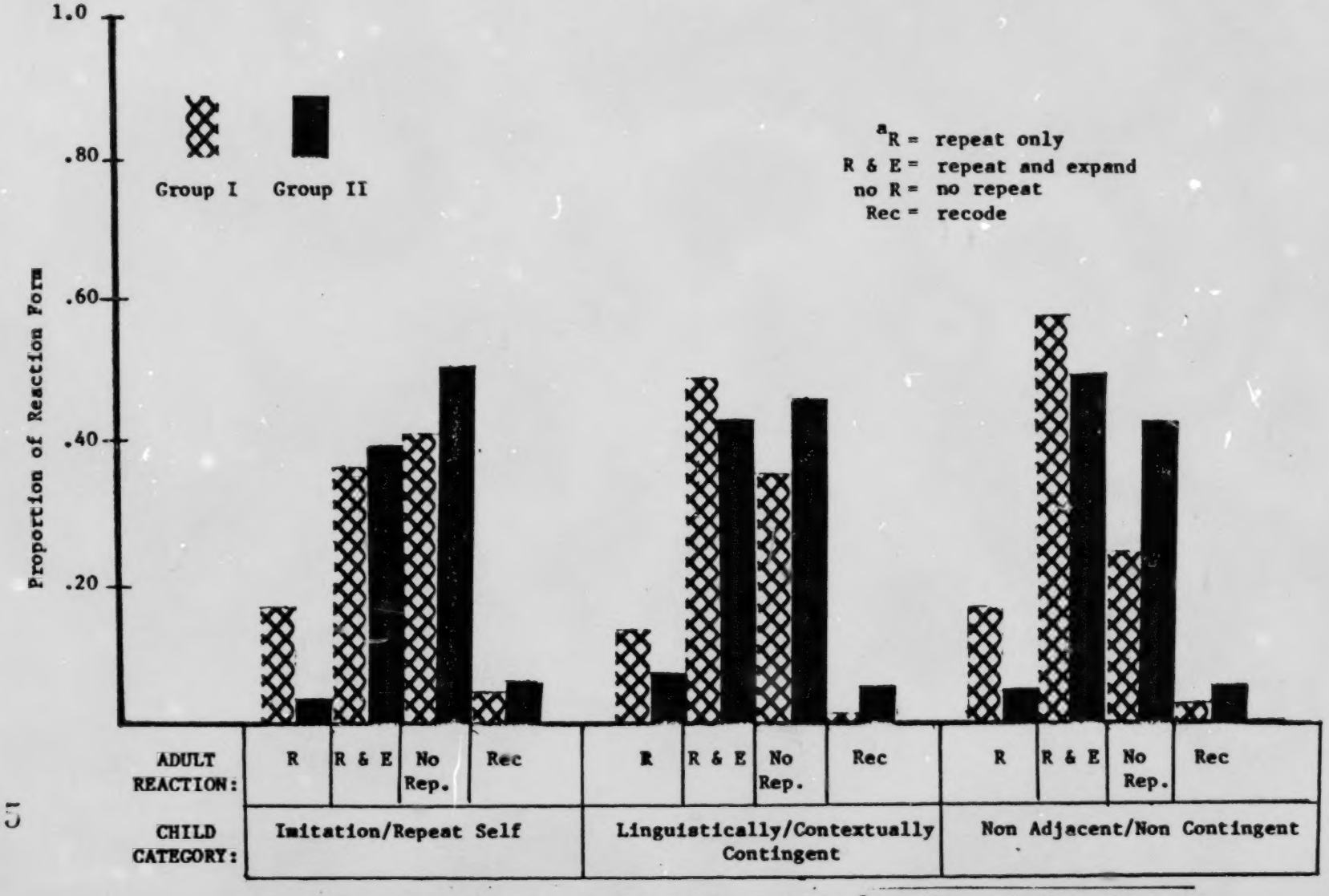

FIGURE 10. Proportional Distribution of Form[a] of Adult Reactions to Major Categories of Child Utterances for Group I and Group II

were analyzed for form, variations were apparent for five adults across categories while T-II consistently repeated and expanded more than 50% of the time for all categories.

Summary and Conclusions

When adult reactions were examined for contingency, it was discovered that very few immediate adult reactions were noncontingent indicating that the adults seldom changed the topic in their immediate reaction to child utterances. However, 13.2% of adult reactions were coded as self contingent suggesting in these cases that the adult did not overtly acknowledge the child's message, which was usually imitative, but referred back to her own preceding message. The highest proportions of reactions, with very few variations across categories of child utterances. were linguistically contingent and when combined with contextually contingent and imitative reactions, indicated that the adults responded to the form and/or content of the child message 76% of the time that a reaction was possible.

In general, reactions which repeated the child in any way were more frequent than utterances which did not repeat. Adults repeated and expanded the language of both groups of children equally with children's spontaneous utterances receiving highest proportions of expansions, children's contingent utterances next, and imitations last. When utterances which recoded but did not repeat were included in the repeat category, it was found that the children with lower MLU were repeated proportionately more often than the children with higher MLU. Utterances of Group I were repeated or repeated and expanded or recoded 62.3% of the time with 53.4% of the utterances of Group II receiving the same reactions. While individual strategies were evident in the

form of reactions, it was concluded that the adults reacted to the children's overall linguistic/communicative abilities rather than to a single measure such as MLU or frequency of imitation.

Child Subsequent Responses

Child utterances which succeeded and were adjacent to adult reactions were designated as Child Subsequent Responses (CSR) and were considered to be the child's second turn in the dyadic exchange between adult and child. As Figure 1 indicates (p. 10), child subsequent responses were then recycled into the next discourse event thus becoming the child's first turn in that exchange. Analysis of CSRs included unintelligible, nonoral and no responses following adult reactions. Unintelligible child utterances were included in the initial count of total child utterances but were not included in further analyses. Nonoral and no responses were not included in the total utterance count. Nonoral subsequent responses included gesture and/or action responses appropriate, but not necessarily the correct response, to the adult reaction. When unintelligible and nonoral responses occurred together, the CSR was coded as unintelligible. No responses included all CSRs in which the child neither responded orally nor nonorally.

The proportion of intelligible CSRs was determined for each child for both teacher and tutor sessions by computing the number of intelligible responses over the number of possible opportunities for subsequent responses. All CSRs which were coded as no response were examined to determine if there had been opportunity for the child to respond. If the adult reaction was in a cluster of utterances, the first utterance in the cluster was analyzed for contingency and the last in the turn

coded as question or statement.

Categories of Response/No Response

Table 11 presents the proportional distribution of intelligible, unintelligible, and nonoral CSRs as well as no responses for each child. The child with lowest overall intelligibility had the lowest proportion of intelligible CSRs as well as the highest proportion of no responses. Although overall intelligibility and intelligible CSRs were not independent, there was no direct relationship between the two measures for the other children. Rather, MLU and proportions of no responses appeared to influence the probability of an intelligible CSR. That is, the overall intelligibility of a child's speech did not necessarily predict that he would give an intelligible CSR or would respond at all following an adult reaction.

Figure 11 displays the proportional distribution of categories of CSR for the two groups of children for all adults. Intelligible CSRs have been subcategorized according to contingency with imitations and repeat self (I/Rs) utterances combined. No response and I/Rs were proportionately similar comprising 73.8% of all possible CSRs for Group I. All Group I children gave more I/Rs responses than linguistically contingent (LC) except for one child with T-I. Linguistically contingent CSRs were most frequent for Group II children with no response next and I/Rs third. All higher MLU children gave more LC than I/Rs subsequent responses with the exception of one child with Tu-A.

Influence of Adult Utterance Type

The question of the influence of adult reactions as questions or statements immediately preceding the CSR is addressed in Figure 12 by category of CSR for the two groups of children. The adult reaction

Table 11

Proportional Distribution of Categories[a] of Child Subsequent Responses (CSR) by Mean Length of Utterance (MLU)

Child	MLU	Intell	NR	Unin	NOR
Art	1.25	.51	.45	.03	.01
Kathy	1.37	.57	.34	.04	.04
Iris	1.46	.53	.37	.07	.02
Betty	1.55	.35	.46	.15	.03
Randy	1.57	.51	.38	.08	.03
Martin	1.65	.58	.30	.05	.07
Valerie	1.87	.67	.29	.03	.01
Debbie	2.17	.52	.33	.15	.01
Sally	2.45	.73	.17	.09	.01
Danny	2.46	.65	.22	.10	.03

[a]Intell = intelligible; NR = no response; Unin = unintelligible; NOR = nonoral

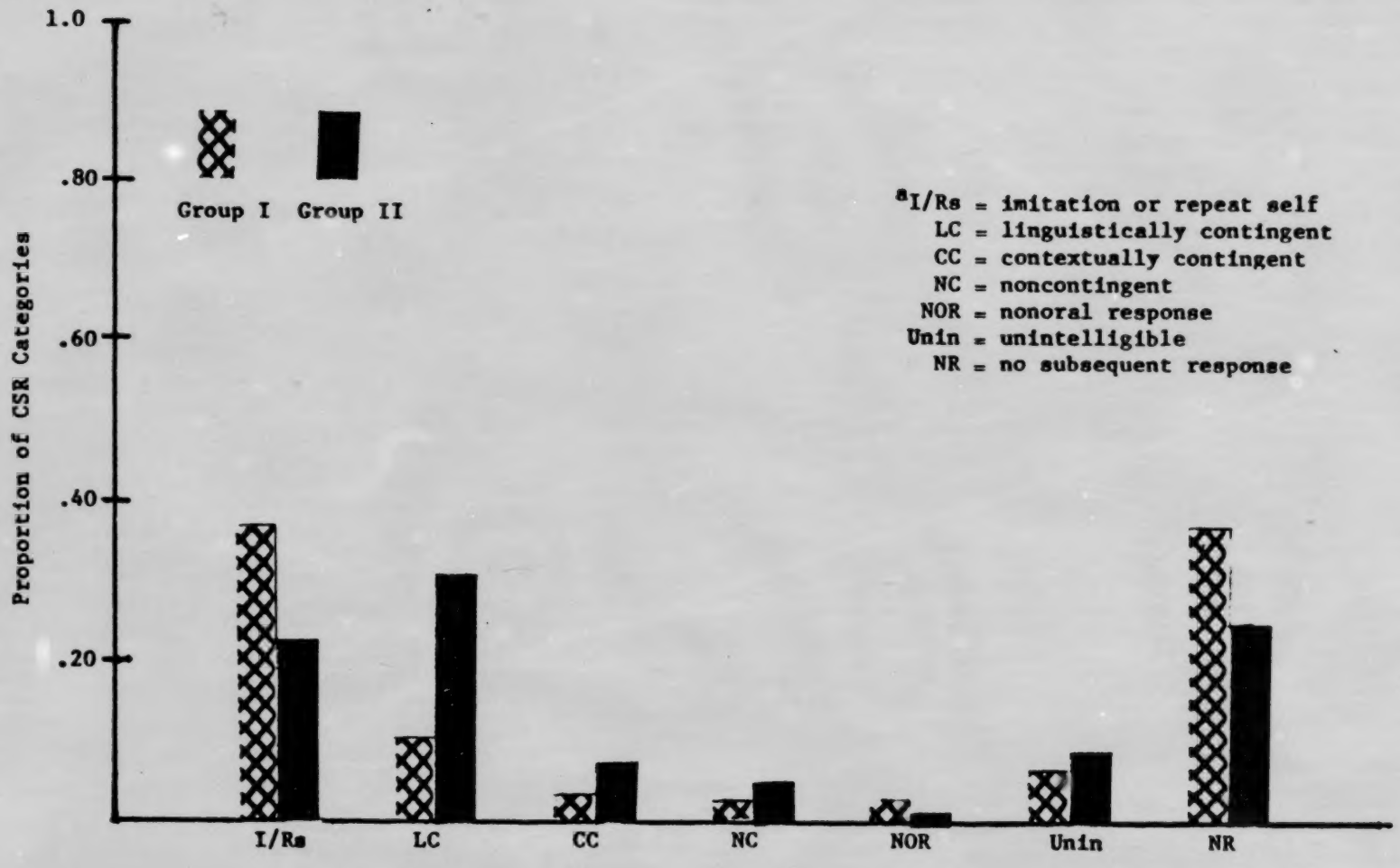

FIGURE 11. Proportional Distribution of Categories[a] of Child Subsequent Responses (CSR) Following Adult Reactions for Group I and Group II

utterance immediately preceding a possible CSR was analyzed for type of CSR with child responses or no responses following statements adding to 100% for each group of children and responses or no responses following questions adding to 100%. Therefore, Group II responded to 50.7% of adult reaction questions with LC responses, 14.7% no response (NR), and 14.2% I/Rs. Group I responded to 27.4% of adult reaction questions with LC responses, 25.4% were NR, and 21.5% I/Rs. Similar proportions of I/Rs and LC subsequent responses to questions were not predicted. The data for individual children were examined to determine if the previous finding for the two children with lowest MLU regarding similar imitative and LC responses to questions influenced the data for all of Group I. Results indicated that no responses were similar for the two children, 27.6%, and the other four children in Group I, 24.7%. However, the former responded with 35.6% I/Rs and 12.6% LC utterances to questions while the average for the other four children in Group I was 17.0% I/Rs and 32.1% LC to questions. During their overall responses, the two children with lowest MLU were as likely to imitate or repeat themselves following an adult question as they were to give a linguistically contingent response to a question. However, almost three times as many I/Rs as LC responses were given to questions by these two children in their second turn in the dyadic exchange with an adult with relatively few LC responses. This finding will be explored in the discussion chapter.

Group II children did not respond to 32.2% of adult statements and 14.7% of their questions while Group I children failed to respond to 42.3% of adult reaction statements and 25.4% of their reaction questions. Therefore, the children with higher MLU responded to more statements as well as to more questions than did the children with lower MLU.

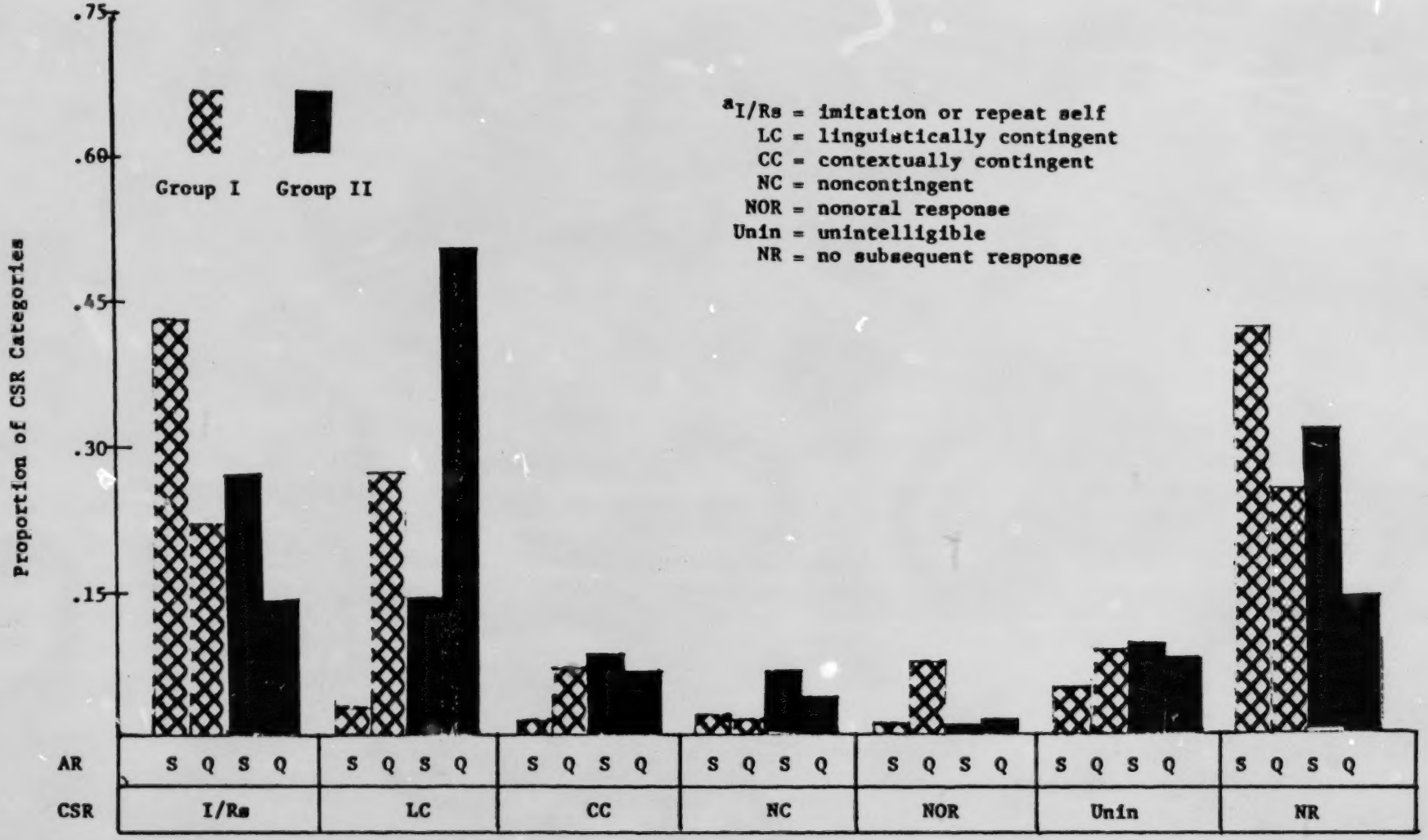

FIGURE 12. Proportional Distribution of Categories[a] of Child Subsequent Responses (CSR) Following Adult Reaction (AR) Statements (S) and Questions (Q) for Group I and Group II

Influence of Adult Reaction Contingency

The influence of the adult's reaction contingency on the preceding child utterance to the child's subsequent response was examined. The proportional distribution of the most frequently occurring categories of CSR following adult reactions is shown for the two groups of children in Figure 13. Of seven possible CSRs, LC and I/Rs were the most frequent to all adult reaction categories for Group II except to the adult noncontingent category. Group II gave LC responses proportionately more and I/Rs responses proportionately less to adult noncontingent reactions than to any other adult category.

Group I imitated adult imitations proportionately more than any other adult category although I/Rs subsequent responses were either proportionately first or second to all adult reaction categories for this group. Group II children also imitated or repeated themselves following adult imitations more than any other adult reaction category with LC subsequent responses the most frequent response given to all other adult categories by this group.

Child Discourse Categories: Overall/CSR

Figure 14 compares the proportion of utterances in overall discourse categories occurring as CSRs for the two groups of children. All four categories occurred more than 50% of the time as CSRs for Group II children indicating that the children with higher MLU were learning to respond following an adult reaction. For Group I children only I/Rs and noncontingent (NC) responses occurred more than 50% of the time as CSRs. The high proportion of NC responses occurring as CSRs however, especially for Group II, indicates that the children were likely to change the topic after an adult reaction.

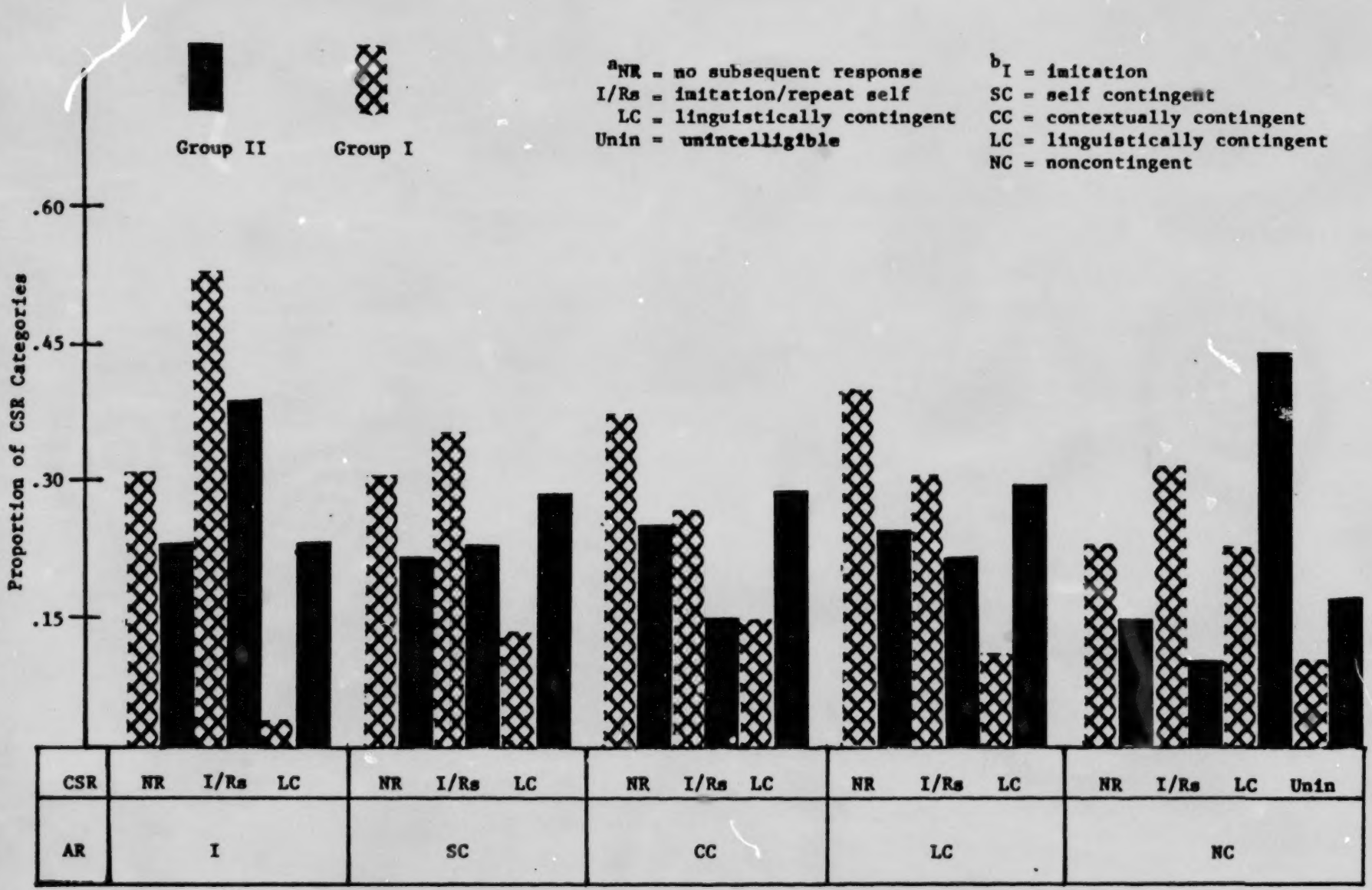

FIGURE 13. Proportions of Most Frequently Occurring Categories of Child Subsequent Responses (CSR)[a] Following Adult Reactions (AR)[b] for Group I and Group II

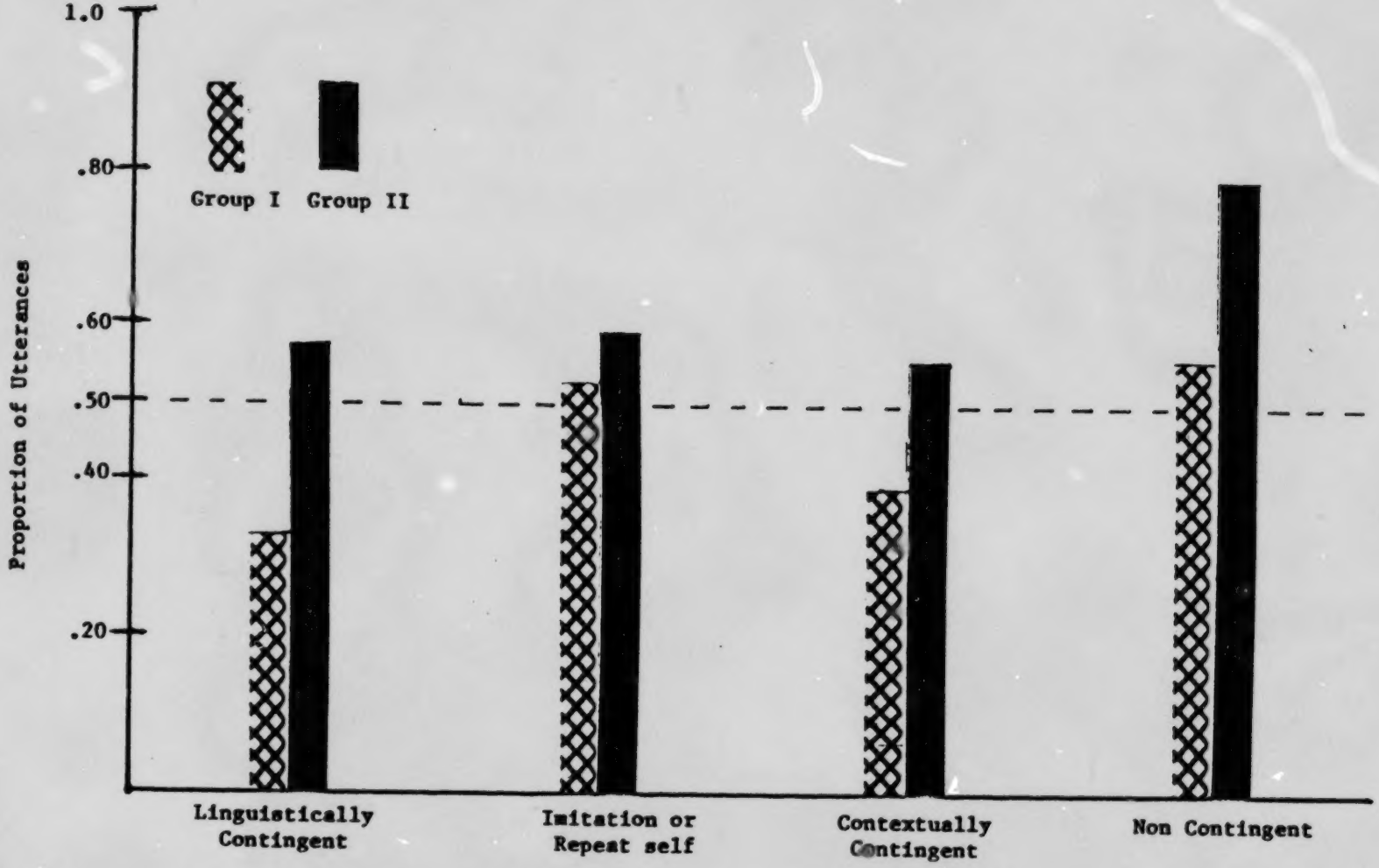

FIGURE 14. Proportion of Utterances in Total Discourse Categories Occurring as Child Subsequent Responses (CSR) for Group I (MLU 1.25-1.65) and Group II (MLU 1.87-2.46)

Summary and Conclusions

Results concerning child subsequent responses (CSR) indicate that utterance type, question or nonquestion, and contingency of the adult reaction influenced the subsequent response. However, the influence was in turn dependent upon the children's overall linguistic ability as reflected by MLU and contingency of the child utterances.

Adult imitations of child utterances were in turn more likely to be imitated by both groups of children. Noncontingent adult reactions, more likely to be questions than statements, received more linguistically contingent CSRs by both groups of children than any other category of adult reaction. Lastly, all children had difficulty in maintaining discourse over more than one turn.

Chapter V

DISCUSSION

The objective of the present study was to determine some of the influences on discourse development in young hearing impaired children who were learning language orally. Since all children must learn not only the semantic and syntactic rules of language but must also learn rules for the use of language, a dyadic exchange between child and teacher as well as between child and tutor was chosen as the basis of the investigation. The present study was not intended as a replication of any other study, rather it was undertaken to determine the knowledge that some young deaf children have about a single aspect of language, namely, the ability to use the information in adult input utterances to form their own messages.

In this chapter the results of the investigation will be discussed including: (1) measures of total utterances; (2) the discourse analysis of child responses and, in particular, the use of imitation as a language learning strategy; (3) adult reactions and their relationship to (4) child subsequent responses; and (5) adult interaction strategies.

Measures of Total Utterances

Ratio of Adult to Child Utterances

The finding that the children spoke only one-third of the total utterances is similar to that found by Collins (1969) with mothers of young deaf children where two-thirds of all communication was produced

by the mothers. Circumstances were similar to the present study in which one adult and one child were interacting in a structured play situation. However, Buckler's (1978) finding that deaf children produced almost one-half of the communication was based on classroom interaction in which there were opportunities for more than one child to respond. More important perhaps than the ratio of adult talk to child talk is the ratio of adult initiated talk to that initiated by the child. This measure varied in classrooms of hearing impaired children with the proportion always higher for the teachers. In Buckler's study, although the amount of teacher talk to child talk was nearly equal, teacher initiated communication was dominant with 90% of all child talk responding. This compares to the finding in the present study where an average of only 18.8% of all child utterances, excluding immediate self-repetitions, were either noncontingent or nonadjacent to adult utterances.

The proportions of nonadjacent speech for the six children in the present study in Group I ranged from .02 to .13 and for the four children in Group II from .03 to .32. Only the two children with the highest MLU with proportions of nonadjacent speech of .32 and .23 respectively were comparable to the hearing children in the Bloom et al. (1976) study and then only to the children in Stage 1 (MLU$<$2.0) whose proportions of nonadjacent speech ranged from .25 to .36. Procedures for interacting with the children differed in the two studies. In the Bloom et al. study investigators tended to follow the lead of the the children while the adults in the observed group elicited language as they usually did during regular language lessons. Therefore, there tended to be fewer opportunities for child initiated speech in the present study.

Volubility

The child with the lowest MLU spoke the fewest number of utterances per minute while the two children with the highest MLU had the two highest measures of volubility. There was no correspondence with MLU for the other seven children. Tamari (1978), who discussed the increase in number of utterances per hour as MLU increased for the Bloom et al. children, found no change as a function of MLU with four mentally retarded children. She discussed possible influences on the amount of child talk such as the input language as well as the knowledge of rules for the use of language. In the present study, it was concluded that both situation and the person interacting with the child influenced the amount of child talk. Nine children talked more with the tutors than with the teachers and seven children talked more during the story situation than during play while story and play talk were equal for two children. In addition, MLU was higher during the story for all children with the exception of the two children with the lowest MLU. Inter-subject variability was evident between the child with the lowest MLU and the two children with the highest MLU in the amount of child talk whereas little inter-subject variability as a function of MLU was evident for the four mentally retarded children in Tamari's study. In was concluded in Chapter IV (p. 80) that while both stimuli and person interacting with the child influenced the amount and length of child utterances, a greater influence appeared to be the linguistic ability of the child. This ability may or may not be adequately reflected by increases in MLU and, as suggested by Tamari, knowledge of rules for the use of language may influence certain linguistic measures such as amount of child talk. In addition, results of the present study strongly suggest that such

knowledge influences the probability and contingency of a child subsequent response.

Mean Length of Utterance (MLU)

Mean length of utterance (MLU) ranging from 1.25 to 2.46 was used as a measure both for inter-subject comparison and for comparison with subjects in other research studies. However, there are several limitations in the use of MLU with hearing impaired children. First, longer utterances tend toward decreased intelligibility and therefore cannot be included in the measure of MLU. A second limitation concerns the general conclusion among researchers that deaf children often encode more than is apparent in their oral or nonoral language. As an example, in the present study T-II and Iris were discussing the elephant in the story and:[1]

(Iris waves left hand forward)

Next week we're going to see the elephants, yes, okay.

elephant/

The teacher glossed the single gesture signifying future plus the single word "elephant" and confirmed that the class was going to the zoo the next week and would see elephants. In another session Randy was playing with the beds in the dollhouse and said:

Tu-A: A boy.

boy/

(Randy pointing to himself)
me/

(Randy waving hand in air)
Sam/ (Randy's brother)

[1]Utterances on the right were spoken by the child and those on the left by the adult. Information of the left in parenthese describes the context. Child utterances begin with lower case letters with utterance boundaries indicated by a slash (/) with the exception of Wh- questions for which a question mark (?) is used and rising intonation utterances which end with a rising arrow (↑).

Me and Sam.

(Randy putting one hand up and the other down) up/

(Randy pointing to self, then to dollhouse) my home/

You have a, a bunk bed.
I know what you mean.

Longer utterances of deaf children tend to be more complex also. Based on their comparison of utterances of hearing and hearing impaired children as measured by Lee's Developmental Sentence Analysis (1974), Geers and Moog (1978) concluded that language difficulties in deaf children are not due simply to language delay. They described the utterances of hearing impaired children as containing "more mature" constructions but fewer correct structures than those used by hearing children with similar scores. Similarly in the study of deaf children using total communication (Edelstein, 1978), it was found that longer utterances of four or more words were the most semantically complex but the most deficient syntactically. That is, when the deaf children increased the length of their utterances, substantive words were added rather than functors or grammatical morphemes. However, utterances of four or more words were not analyzed for semantic-syntactic relations in the Edelstein study, and it is possible that the children were developing as hearing children do, by coordinating content categories within the three constituent subject-verb-complement frame as outlined by Bloom and Lahey (1978). On the other hand, it is probable that the children were incorporating more complex structures within their utterances to form what Kretschmer and Kretschmer described as the "kaleidescoping of developmental stages, or even unusual variation in linguistic stages, thereby producing behaviors not usually seen in young

normally hearing children" (1978, p. 105). In the present study, utterances of four or more words were infrequent and when they did occur, they most often contained repetitives. However, there were instances of utterances such as "open monk over there↑" and "dog open door out" which suggested that longer utterances might contain more complex ideas. The addition of signs and gestures in the Edelstein study did not measureably increase MLU to that expected of hearing children of the same ages. Therefore, the influence on MLU of both encoding more than is apparent in the surface structure and adding semantic but not syntactic complexity to utterances might be unique to hearing impaired populations. Comparisons made with other populations of like MLU would thus be questionable.

Conversely, MLU in the present study tended to be inflated by several factors: (1) the inclusion of elicited imitations; (2) the use of the question form how many-; (3) the use of repetitives; and (4) the encoding of function rather than identity of objects. Elicited imitations and immediate self-repetitions were included in the present study but not in the studies reported by Bloom et al. (1976) or Tamari (1978) while elicited imitations were reported separately in the Schiff study (1979). It had been previously noted that the observed children were seldom directly requested to imitate; rather each adult used implicit nonverbal strategies as well as linguistic strategies such as modeling and dialogue for eliciting imitations. Thus, all imitations were included in the computation for MLU with MLU -I/Rs computed separately and the children compared for rank order. Only one child changed order, however, she remained not only in Group I but also within the subgroup of Group Ib when I/Rs utterances were omitted. Therefore, inter-group comparisons

could still be made on the basis of total utterance MLU. For the two children with the highest MLU, I/Rs utterances were not longer than other utterances. This finding will be discussed further in the section on child imitations (p. 170).

The second factor concerned the use of the question form how many-. The children often responded by counting "one, two, three, four, five, six" rather than "six". The third factor which appeared to inflate MLU was the use of repetitives for emphasis and plurality or continued action often occurring with chained actions by the child, for example:

(Kathy walking peg man up ladder,
Tu-A puts hand over Kathy's hand,
looks at Kathy, pauses)

(Both Tu-A and Kathy walking
peg man up the ladder) up up up up/

and:

(Debbie touching each animal
on the page) brown brown brown brown
brown brown brown/

Tu-B: What is that?

(Debbie rubbing both hands over
own shirt which is brown) brown/

They're all__.
Everything's brown.
That's right.

and:

(Danny looking at page in book
where the boy is crying, Danny
rubbing fist near own eye) the boy crying crying/

T-III: Aw, boy's crying.

Each of the six adults used repetitives which were limited to verbs and adverbs of action and locative action, for example:

(T-II and Iris looking at first page of the book)	
All right, what about the boy? What's he doing?	
(Iris nodding toward the boy and then toward the dog)	boy/ dog/
(T-II moving own head back and forth for emphasis) The boy and the dog are walking and walking and walking.	walk walk walk/
Yes, the boy and the dog are walking.	

The use of repetitives is not idiosyncratic to the children in the present study. Similar results were found by Edelstein (1978) who concluded that plurals and superlatives were encoded through the repetition of the referent rather than through the use of morphological inflections by deaf children using total communication. The use of repetitives was also reported by Jones and Quigley (1979) who found that the signed question form was often repeated within an utterance in both the language of deaf parents and in the language of their hearing children.

Another type of repetitive referred to in the literature is termed copying and has been found in deaf children's written forms of complex language (Quigley, Power, and Steinkamp, 1977), for example, "John saw the boy who the boy kicked the ball". The existence of copying in oral language has not been reported but several instances were noted in the present study for one subject, for example:

(Valerie and T-IV discussing story where the boy is looking at the dog who is in the monkey cage)

Val, how many boys do you see?

boy look dog dog monkey cage/

He's looking at the dog in the monkey cage.
There's one boy.
There's one boy.

and:

(Tu-B turning page)
Oh, okay, I'm gonna turn the page.

(Tu-B palm out)
What's happening?

the dog boy walking dog home/

Oh: they're going home.

A final factor affecting MLU is the encoding of function rather than identity when the name is either not known or has been learned in connection with function or action, for example:

(Tu-A pointing to door of dollhouse)
What's that?

open door/

(Tu-A putting hand to mouth and saying to investigator)
They all say that.

It's a door.

door/

and:

(Tu-A touching fence in the book)
What's around the cages?

(Betty shaking finger in air, flipping hand behind self)

no go/

You can't go over. It's a fence.

and:

(Tu-A lifting up apron on
mother doll, saying to Sally:)
What's that?

make cook/

Yes, she cooks with this.
(Tu-A covering own mouth)
It's called an apron.
Apron.

apron/

Although many factors affect MLU with hearing impaired children, the measure proved to be effective in comparing children within the present study who were divided into groups described by Brown (1973) as early Stage 1, late Stage 1, and Stage 2. Not only did the adults' MLU correspond to the children's with lower adult MLU occurring with lower child MLU and adult MLU higher with Group II children, but linguistic measures throughout the study showed differences between groups and among subgroups of children based on MLU. Mean adult MLU for sessions in which child MLU averaged 1.35, 1.65, and 2.32 were 4.04, 4.69, and 5.03 respectively. The mean difference between child and mother MLU was calculated as less than three morphemes in the studies by Cross (1977) and Seitz and Stewart (1975). Therefore, the ratio of adult to child MLU in the present study was comparable to that found with mothers and young hearing children.

The Adult Model

The adults provided language models that were consistent with reports of adult spoken language in the research literature with hearing children. There were very few ungrammatical utterances, little more than one-third of one percent. Utterances that were auditorially distorted in some

way which might interfere with aural reception comprised 2.8% of the total number of adult utterances. While this percentage is low, it does indicate that teachers need to monitor their own speech periodically to be consistent in presenting a clear auditory model to hearing impaired children. An additional 2.6% of the adult utterances were self-corrected or incomplete utterances. Both were considered by the investigator as beneficial for language learning since during self-corrected speech, the adult corrected her own syntax or lexicon and in incomplete utterances she interrupted her own speech to allow the child to speak. This was considered more beneficial than talking-over the child. However, since one of the discourse rules that a child must learn has to do with turn-taking, neither continual talking-over by the adult nor interruptions by the child would allow for the necessary learning.

Speech Emphasis

Adult utterances were considered as speech emphasis if the adult directly requested or indirectly implied that the child repeat his own utterance using better speech or repeat a model presented by the adult with emphasis on patterns of connected language or correction of word production. An average of 10.3% of the total adult utterances were related to speech production. Buckler (1978) found that a little over 9% of the adult speech in her study was related to language mechanics which included "perfecting speech, developing spelling skills, improving and/or expanding syntactic competence, and increasing vocabulary" (p. 59). Speech emphasis and language mechanics do not imply the same focus. The four teachers in the Buckler study of first to seventh grade deaf children were engaged in instructing about the world while the speech of the

adults in the present study was clearly a language-teaching language rather than a language of socialization as described by Gleason and Weintraub (1978). It is not surprising that the adult speech in the present study could be so described. Much of their spoken language consisted of providing lexical forms and language structures both spontaneously and in reaction to child utterances. However, as in the Buckler study, children were not constantly interrupted to repeat themselves or the adult for improvement of speech production.

Discourse Analysis of Child Responses

There have been no studies of discourse with hearing impaired children comparable to those reported by Bloom et al. (1976) and by Schiff (1979). In the present study, the children responded with linguistically contingent (LC) utterances almost four times as often to questions as to nonquestions and with imitations (I) more than five times as often to nonquestions as to questions. Bloom et al. found that their children responded with more than twice as many LC utterances to questions as to nonquestions and with more than twice as many imitations to nonquestions as to questions and concluded therefore, that the children were differentially responding to questions. The deaf children not only responded differentially to questions but did so to an even greater extent than did the hearing children in the Bloom study.

When the children in the Bloom study and in the present study were compared by stage, it was found that frequencies for imitations and LC utterances were proportionately similar with imitations more frequent during Stage 1 for both groups and LC utterances more frequent for Stage 2 children. Procedures differed for the two studies since the Bloom study

was longitudinal and the present study cross-sectional. Therefore, results are compared tentatively; however, it does appear that differences in the hearing impaired children's MLU reflect more than one aspect of linguistic ability as was also concluded by Curtiss, Prutting, and Lowell (1979) who used MLU as a measure of linguistic ability in young deaf children. The observed children in Group II not only responded with more LC than imitative utterances as did the hearing children but also showed evidence of responding with LC utterances to nonquestions. Bloom found that LC utterances increased to both questions and nonquestions with the proportional increase greater to nonquestions. That is, the children progressed from imitating to using the information in the preceding adult adult utterance to form their own messages, and they did so increasingly to nonquestions although LC responses to questions remained proportionately greater. The deaf children in Group II appeared to be learning to respond with LC utterances to nonquestions, but it was apparent that for these children responding to nonquestions with more than imitations was a difficult task.

In both studies with hearing children (Bloom et al., 1976; Schiff, 1979), noncontingent speech or speech not related to the topic of the preceding adult utterance comprised substantial proportions of child adjacent utterances. When Stages 1 and 2 were combined, approximately 40% of the adjacent utterances of the Bloom children were noncontingent. Bloom considered the relatively high proportions of nonadjacent and noncontingent speech as evidence that it is easier for young children to produce spontaneous speech than it is to produce contingent speech. While Schiff did not report the proportions of nonadjacent utterances, the mean proportion of adjacent speech that was noncontingent for the hearing

children of deaf parents was .22. While not so high as that found by Bloom et al., the proportion was considerably higher than that found for the observed children where less than 6% of adjacent child speech was noncontingent. The low proportion of spontaneous speech for the hearing impaired children points to the necessity of their learning language in context. In general, the utterances of the deaf children were dependent upon the form and/or content of the adult utterances as indicated by the proportions of topic-related child speech.

Topic-Related Child Speech

The high percentage of topic-related speech, 71.3% of all speech for the ten children with a range of 57.1% to 85.2% exceeds that found by Bloom et al. for the hearing children during Stage 1 and Stage 2 where a mean of approximately 39% of the sample of child speech was related by topic to the preceding adult utterance. When adjacent speech was considered, 60% of Bloom's, 75% of Schiff's, and 86% of the observed children's utterances were topic-related. The deaf children, therefore, not only spoke after another person's utterance but related their utterances to the topic of the preceding utterance. It might be said that for the most part, the hearing impaired children had overlearned the rules; however, it is more likely that the limited linguistic abilities of the children made generating spontaneous messages more difficult than formulating utterances which were related to the adult topic.

Not only were the proportions of the children's nonadjacent and noncontingent speech low, but contextually contingent (CC) utterances also were proportionately few. Contextually contingent utterances by definition required a different verb relation than that in the adult

utterance. It appeared to be easier to use either the verb relation of the adult utterance or a replacement verb rather than to use a different verb relation. Where the children in the Bloom study used proportionately more CC utterances during Stages 1 and 2 than in later stages, only the two children with the highest MLU in the present study responded with significant numbers of CC utterances. In Table 8 (p. 92) it was noted that these children repeated and added almost twice as often for LC as for CC speech with more add word/phrase and add sentence for CC utterances. It is possible that this reflects a beginning ability to compose messages not dependent on the form of the adult message which was a task the hearing children found relatively easy to accomplish. One-third of CC utterances for all of the deaf children resulted from responding with a different relation from that requested by the adult, for example:

Adult: What is the boy saying?

Child: cry/

The latter category of CC utterances partially explains why more CC utterances followed questions. However, it is evident that the hearing impaired children had difficulty in responding to statements with other than imitations. Only one child, Sally, responded with CC utterances proportionately more to statements than to questions as did the children in the Bloom study. Sally not only presented the best aided as well as unaided hearing levels but also was one of the two children with the highest MLU.

While proportions of LC to imitative utterances were similar for Stage 1 and Stage 2 children in both the Bloom and the present study, low incidences of noncontingent utterances resulted in higher proportions of contingent and imitative adjacent speech in the observed children.

Contingent speech averaged 50% and imitations 25% of the Schiff children's adjacent speech while in the present study, contingent speech averaged 52.9% and imitations 41.4% of adjacent speech with self-repetitions omitted. The proportion of imitations for Group II (24.3%) was similar to the proportion of imitations for the Schiff children when means were combined for Stages 1-3. For the Bloom children in Stages 1 and 2, imitative speech comprised 31.5% and in the observed children 43.9% of topic-related speech. When proportions of topic-related speech were compared for the Bloom study and the present study for Stage 1, 46.7% of the former was imitation and 55.9% of the latter was imitation; during Stage 2, 16.3% was imitation for the Bloom children and 25.4% imitation for the observed children. In the present study, imitations included some additions from the adult utterance to the child utterance but not in the compared group. Also elicited imitations were included in the present study but not in the Bloom study. Therefore, differences among children in the three studies at similar stages were greatest for nonadjacent and noncontingent speech.

The hearing children in Bloom's study and the observed hearing impaired children differed in the development of the form of LC utterances. The hearing impaired children also <u>added word/phrase</u>, <u>added sentences</u>, and <u>repeated and added</u>, with a few instances of <u>recode and add</u>, and <u>recode and repeat and add</u>. For both hearing and hearing impaired children <u>add word/phrase</u> was most frequent for Stage 1 children. However, for the hearing children in Stage 2, <u>repeat and add</u> was most frequent. While the hearing impaired children did <u>repeat and add</u>, <u>add word/phrase</u> was most frequent for Group II children even for the two children with highest MLU.

<u>Recodings</u> were not found by Bloom to change developmentally and

therefore were not included in the discussion of the form of LC speech. Since it has been frequently reported that hearing impaired children have difficulty learning to use pronouns (Kretschmer and Kretschmer, 1978; Wilbur, Montanelli, and Quigley, 1976), the recode and recode and repeat categories were added in the present study. Results indicated that recodings did not occur with Group Ia children and only minimally with the other children. Recode and add occurred only with the two children with the highest MLU, Sally and Danny, with many of Danny's recodings ambiguous in meaning for he often recoded from third person to first person. Recode and repeat and add occurred only four times and then only with Danny and Sally. The single occurrence with another child, "I do it", following the adult's "What do you want to do?" was probably a learned response. These results tend to substantiate the general observation that the use of pronouns is a difficult task for deaf children.

The yes/no category was not found by Bloom to be developmental; however, the children had evidently already developed yes/no answering strategies. In the present study, the children with MLU from 1.55 to 2.17 and the two children with MLU of 2.45 and 2.46 had equal proportions of yes/no responses, for 27% of their LC replies. The three children with MLU less than 1.50 gave few yes/no oral or nonoral responses. For the two children with the lowest MLU, the finding that they had similar frequencies of LC and imitative responses to questions led to the hypothesis that they might have been differentially responding to Yes/No questions with imitative responses. Imitation of Yes/No questions has been reported as a response strategy for at least one hearing child (Steffenson, 1978). The subsequent finding that the two hearing impaired children with the lowest MLU not only imitated questions but imitated Yes/No and intonated

interrogatives three times as often as Wh- questions, suggests that imitation might serve as a response strategy to Yes/No questions for some hearing impaired children and, further, that the strategy might be a developmental one.

To summarize the form of LC utterances, add word/phrase was easier for all of the children in the present study than repeat and add both for the children with the lowest MLU for whom imitations comprised 70% of their topic-related speech and for the children with the highest MLU whose topic-related speech was 25% imitative.

In order to repeat and add, part of the preceding adult utterance had to be selected for repetition. Bloom found that the most frequently repeated constituent by the hearing children at Stage 2 was the verb with the verb repeated in 66% of all repeat and add utterances. For the children with MLU less than 1.50 in the present study, no verbs were repeated. The children with MLU from 1.55 to 2.17 repeated the verb in 32.6% of their repeat and add utterances, and the two children with the highest MLU repeated the verb 50% of the time. The verb has been loosely defined since it included adverbs of direction such as "out", "away", and "up" which were often used by the children in place of the verb. Bloom and Lahey (1978) reported that "out" and "away" were frequently used by the hearing children as verbs of locative action. The children in Tamari's study (1979) also used "away" as a locative action verb. However, adverbs of direction do not take inflections and children must learn to use the main verb as well in any two-part verb system. The question of the constituent encoded in locative action events was raised by Tamari who found that the mentally retarded children used verbs as frequently as normal children to encode action relations but much less frequently to encode locative action

events. Instead place was encoded with the preposition functioning as the verb, for example, "in there" and "on chair" (p. 126). Tamari concluded that cognitive delay as well as visual and pragmatic saliency might account for the place constituent being encoded in lieu of the verb.

Several studies with hearing impaired children have also reported a focus on the place constituent in locative events. Curtiss et al. (1979) found that hearing impaired children ranked higher in encoding the semantic category locative than did a group of comparable hearing children which was interpreted as being due to visual orientation and early focus on location by hearing impaired children. This finding was also supported by Goldin-Meadow and Feldman (1975) in a study of gesture systems developed by deaf children of hearing parents. Additionally, six to nine year old deaf children using total communication often used reverse word order in encoding agent and location as well as action and location but not with agent and action (Edelstein, 1978). In other words, location was often encoded before the subject or the verb in two-term locative relations again lending support to the visual salience claim.

Locative action relations ranked second for both groups of children in the present study for utterances imitated. Examination of both action and locative action imitations revealed that the verb was repeated in action relations 73.7% of the time while in locative action utterances, the verb was repeated 46.3% of the time with location imitated 40.1%. When the verb was imitated, location was also included 91% of the time, therefore, even when the verb was one of the constituents imitated, location, usually in the form of locative adverbs or prepostions was also imitated. What is not clear is whether the locative adverb or preposition operates as a verb or as a location. The definition for

locative action which requires a change in location suggests that the focus may be on the goal of the movement. Words such as "away", "out", "up", "down", and "off" which were used by the hearing impaired children appeared to be operating as verbs and are used by adults as part of the verb to indicate direction. The children often imitated only the locative adverb, for example:

(T-II pointing to dog, moving finger from the cage out the door)
And the dog comes out.

out/

The dog comes out.

dog out/

The emphasis on locative markers is reflected in the written language of older deaf children:

> Locative forms to represent adverbials other than location [are used] to such a point that one must assume either that adverbials other than location are not a functional part of these persons' linguistic repertoire, or that deaf writers do not truly understand the semantic role that case markers such as prepositions play within language. (Kretschmer and Kretschmer, 1978, p. 121)

Therefore, whatever factors contribute, deaf children using gesture, total communication, and oral language as well as normally hearing mentally retarded children focus on the direction/location of locative action events. It is possible that later differences in written language (Kretschmer and Kretschmer, 1978) originate in this early development.

The question of the difficulty of learning pro-verbs such as "put", "do", and "go" which can be used in many different situations and to describe many actions in relation to objects, people, and locations has been raised (Tamari, 1978). However, examination of the Tamari data revealed that "do" was the most frequent action verb used by the mentally

retarded children while place was encoded in locative action events and the pro-verbs "go" and "put" used infrequently. Protocols for the children in the present study revealed that "do" was seldom encoded by the children but was the most frequent verb replaced by the children. That is, what - doing adult questions required replacement of the pro-verb with a specific or descriptive verb. When children repeat and add in response to a what - doing question, a constituent other than the verb is repeated and the verb replaced, for example:

Adult: What did the dog do?

Child: dog run/

Locative action questions, on the other hand, require replacement of the Wh- form with the place. For example, in locative action questions with the pro-verb "go", children often repeat the verb and add location.

Adult: Where's he going?

Child: go home/

In conclusion, since deaf children, as do hearing children, respond differentially to questions and since children must learn to repeat and add to the adult utterance, a necessary step in intervention would be to encourage children to repeat and add. Studies of both hearing and hearing impaired children serve to suggest which constituents can be repeated in repeat and add utterances which in turn appear to depend upon the major semantic-syntactic relation of the preceding adult utterance.

Imitation as a Learning Strategy

Imitation, historically a major teaching/learning strategy with hearing impaired children, has recently been questioned for its effectiveness for language learning (Ling and Ling, 1978) since there are conflicting reports on the efficacy or necessity of imitation as a

language learning strategy for hearing children. Studies which have investigated imitation in hearing impaired children have been few. Recently Geers and Moog (1978) compared spontaneous speech and elicited imitations of hearing impaired children and found that the maturity of spontaneous language rather than the ability to imitate was related to the development of complex reading skills. Bloom et al. (1976) concluded that linguistically contingent (LC) speech increases and imitations decrease as children develop linguistically with a close examination of LC speech revealing that imitation actually changes as the child learns to repeat, add, and recode. Important implications from the conclusions of both Bloom et al. with hearing children and Geers and Moog with hearing impaired children suggest that more precise imitation does not necessarily lead to the development of mature spontaneous language. Rather, the ability to select constituents to imitate would seem to reflect increasing linguistic development.

Results of the present study indicate that the children imitated the most immediate lexical items as had been found by Ervin (1964) and Blasdell and Jensen (1970) since the highest proportion of imitations by both Group I and Group II children were last word and last two words of the preceding adult utterances. The higher proportion of reduced verb, selected word(s), and entire utterance $\geq$ three words reported as 48.4% of all imitative utterances for Group II reflects an ability for these children not only to imitate longer utterances but to imitate, especially in entire utterance and reduced verb utterances, at least two of the major constituents present in the adult utterance. Preciseness was not a factor since morphological endings and articles were not considered if omitted. Indeed for the two children with highest MLU, imitative utterances were

not longer than nonimitative utterances. Therefore, the ability to imitate exactly the adult utterance is not so important as learning whether to imitate or not imitate as well as determining which features of the utterance to imitate.

The role of the imitation for the child is also important. Ramer (1976) found that children who imitated extensively did not simply imitate more frequently but used imitations for several functions. In the present study, the two children who had the highest proportion of imitations of all of the children did, in fact, appear to use imitations to serve several functions. Since approximately 60% of their total utterances and over 70% of their topic-related speech was imitative, they were obviously using imitation as a conversational device as suggested by Bloom et al. (1974) and by Rees who concluded "imitative behavior may be a critical factor in the child's learning to establish and maintain communication" (1975, p. 347). The children, moreover, imitated according to the intent of the adult utterance. For example, the high proportion of single words imitated by Group I children reflected not only higher proportions of single words used by the adults with this group but also the finding that the adult communicative intent of 40% of the single words imitated by these children was for purposes of speech correction. In addition, results indicated that the two children with the lowest MLU might have been using imitation as a means of responding to Yes/No questions. Results are based on only two children for the latter finding, however, and generalization to other hearing impaired children should be undertaken with caution. The question of imitation as a beginning response strategy to Yes/No questions remains to be investigated further with implications for intervention carefully considered.

The conclusion by Folger and Chapman (1978) that children imitate when given the pragmatic clues to do so and not when at a loss as to how to respond as had been suggested by Rees (1975) was at least partially substantiated in the present study. The finding that three of the children imitated more with their tutor than with their teacher was explained by the communicative intent of the adult utterances since speech emphasis was more the focus in the tutor's speech with the children. For example, 2.4% of T-I's speech with Randy, 2.9% of her speech with Betty, and 0.5% with Sally were coded speech emphasis while 17.5%, 9.5%, and 25.0% of Tu-A's speech with the same children was so coded.

In addition to serving various functions for the children, changes from the adult utterance to the child utterance indicate that imitations were being processed in many instances, for example:

Change of word order:

Tu-A:	The dog is walking the dog.
Randy:	dog walking/
Tu-B:	The boy's walking with the dog.
Valerie:	the boy dog walking/

Changing to a repetitive:

Tu-A:	They're walking.
Iris:	walk walk/

Changing the form of the verb:

Tu-B:	You have to push.
Valerie:	pushing/
T-III:	The girl woke up.
Debbie:	girl wake up/

Answering a question through imitation:

Tu-B;	That way↑
Valerie:	that way/ (nodding)

(Val points to tutor's hand)
Tu-B: You think it's in that one↑
Valerie: that one/

Changing form of the noun imitated:

Tu-A: Why is the dog happy?
Sally: why is doggie happy?
he like boy/

Imitating with accompanying actions:

Tu-B: You gonna put the chairs in the kitchen↑
Valerie chair/ (putting one chair in)
chair/ (putting another chair in)

(Sally takes two dolls out of the airplane)
Tu-A: They're getting off the plane.
They're going home.
Sally: bye/ (walking dolls on table)
go home/ (putting dolls on floor)

Therefore Keenan's (1977) conclusions that all repetitions are not imitations, and all imitations are not repetitions was substantiated in the present study. That the children selectively imitated when explicitly requested to imitate as Keenan reported was also found with the hearing impaired children. This was true also of dialogue used as a model. The children imitated the dialogue but not the lead-in, for example:

T-I: He said, "My dog ran away".
Randy: my dog ran way/

Keenan's statement that an utterance that replicates in form does not necessarily replicate in meaning was observed in the following example:

(Tu-A covering mouth)
The dog is with the baby monkeys.
doggie baby monkey/
Okay.
(Sally pointing to the dog) that not monkey/
No, that's not__.
(Sally spreading hands apart) he too big/
Right.

Sally imitated the adult utterance and then evidently realized the meaning of what she had repeated, identity rather than the locative state relation of the adult utterance. She then proceeded to deny the identity and explain it. This example raises the question of meaning involved in repetitions. The use of imitation as a learning strategy can only be effective if the form of the utterance, the content or meaning, and the way it is used are interrelated to enable repetition to develop beyond imitation. That is, for a child to repeat and add, the linguistic elements to be repeated must be understood in relation to the context of the situation. According to Bloom et al. (1974), imitation functions as a means of processing the relations between form and content of language.

Slobin (1968) and Folger and Chapman (1978) found that children tend to imitate adult expansions. If children do imitate that which they are in the process of learning as suggested by Bloom et al. (1974) and others, child imitations which were originally initiated by the child in whole or in part might be expanded by the child in a subsequent imitation if an adult expansion intervenes. Such proved to be the case in the present study with the children adding a lexical item(s) to their subsequent imitation 60.3% of the time for Group I and 86.2% of the time for Group II children. Adult initiated utterances which were imitated by the children were not analyzed in the same way; however, it appeared that adult expansions did not often occur after a child imitated an adult initiated utterance. The question of whether imitated utterances originated with the adult or with the child needs to be studied further with regard to both adult expansions and child subsequent expansions.

In conclusion, the question of the use of imitation as a teaching/learning strategy with hearing impaired children concerns not its efficacy

for language learning but how it can be most effectively used with those deaf children who do imitate. In the light of the results regarding the form of linguistically contingent utterances for both hearing and hearing impaired children, a second important question concerns how a child learns to repeat selectively and add to the repetition to form contingent messages.

Adult Reactions

The immediate adult reactions were analyzed as was suggested by Buckler (1978) for their effect on subsequent responses of hearing impaired children. Therefore, adult reactions were considered in terms of form (repeating, repeating and expanding, not repeating the child utterance), type (question or nonquestion), and contingency on the preceding child utterance for their possible effects on child subsequent responses (CSR). Adult reactions have been discussed in the literature in terms of expansions or other modifications of child speech (Brown and Bellugi, 1964; Cross, 1977; De Paulo and Bonvillian, 1978; Nelson, 1973; Nelson, Carskaddon, and Bonvillian, 1973; Seitz and Stewart, 1975; and others) and as related to changes in adult-child interactions depending upon the ages and linguistic abilities of the children (Bloom, Rocissano, and Hood, 1976; Brown, 1973; Garnica, 1977; Gleason and Weintraub, 1978; Moerk, 1974, 1975; Phillips, 1973; and others). Nelson (1973), who found low porportions of mothers' speech to two year olds to be imitations or expansions, hypothesized that

mothers may expand children's more complex speech. Seitz and Stewart (1975) however, found mothers' expansions to be positively correlated with the children's use of imitation while Folger and Chapman (1978) found positive correlations between mothers' use of imitation, including expansions, with children's use of imitations. The adults in the present study varied across children and child utterance categories for repetitions and nonrepetitions. Reaction statements were three times as likely to repeat the preceding child utterance while reaction questions were more variable with a higher proportion of nonrepetitions than for statements. Teacher II who used lower proportions of reaction questions than overall questions also tended consistently to repeat the children across all child utterance categories. Whether children were repeated depended somewhat on the type of utterance, statement or question, used as a reaction. Utterances of children with higher MLU were not expanded more often contrary to the finding of Seitz and Stewart (1975); however, children who imitated more were in turn imitated more by the adults.

The finding that while children who imitated more were in turn imitated more by the adults was not surprising; however, the finding that the imitations of Group I were not imitated more than other categories of child utterances was. More NA/NC or spontaneous utterances of Group I children were imitated by each adult. Since imitations could by definition contain certain expansions, utterances which repeated only or repeated and expanded were analyzed. Results revealed that I/Rs and NA/NC utterances received nearly equal proportions of adult exact repetitions for Group I children with higher proportions of repeat and expand reactions given to NA/NC utterances for both groups. It might be said that the adults provided linguistic information by repeating and expanding more spontaneous

utterances of the children rather than utterances which were related by topic to the adult utterance. The adults followed the lead of the children by repeating and expanding when spontaneous utterances occurred. However, this must be concluded tentatively since there were proportionately few spontaneous utterances. That I/Rs utterances were not repeated more than other categories for both groups probably reflects the finding that when children imitated for improvement of speech, the adults often acknowledged the imitation by saying "right" or "okay" when satisfied with the production. Also imitations were often reacted to with self contingent utterances.

The finding that, in general, children with higher proportions of spontaneous utterances received higher proportions of no reactions by the adults indicates the child's influence upon the adult's interaction strategies. For the children who initiated more conversation, three of the adults did not seem compelled to react to every utterance. When spontaneous speech was reacted to, the adults reacted with linguistically contingent utterances and by repeating and expanding. On the other hand, an adult's influence on a child was evident in Tu-A's interactions with Art, the child with the lowest MLU. More nonadjacent utterances occurred with high proportions of no reactions by the adult; however, over 80% of the nonadjacent utterances were actually elicited by the tutor's actions. Therefore, while higher proportions of both nonadjacent utterances by the child and no reactions by the adult might indicate more spontaneous language by the child, the resulting proportions did not, in fact, reflect true spontaneous language. Instead a change in the adult's interaction strategies resulted in artificial proportions of nonadjacent utterances by the child and no reactions by the adult.

Scroggs (1975) reported that it was necessary for the teachers in her study to use a 50% level of expansions in order for teachers and hearing impaired children to talk about the same topic. In the present study, the adults expanded almost 50% of the time and when linguistically contingent, contextually contingent, and imitative reactions were combined, it was concluded that the adults were responding to the form and/or content of the child message over 75% of the time that reactions were possible. Individual adults consistently responded with more linguistically contingent reactions for all children and across all categories of child utterances with the exception of T-I with one child for I/Rs utterances and with another child with NA/NC utterances. Although the high percentage of 75% might seem to indicate that the adults were following the lead of the children most of the time, such was not the case. The adults tended to direct the child back to the adult message whenever the child's response was not the one specifically requested, for example:

Tu-B: Ah, is the boy happy?

boy, where dog? (CC)

(Tu-B palm out)
The boy says "Where's my dog?"
(Tu-B touching dog)
Is he happy?

no/
angry/

and:

Tu-A: Is the dog happy?

(Sally pointing to monkey, pointing out)

he not get out/ (NC)

Maybe they got out.
Is the dog happy?

yeah/

Yeah.

and:

(T-II pointing to the boy)
What do you think the boy says?

(Art running finger down his cheek) crying/ (CC)

The boy, do you think the boy's going to cry?
He feels very sad.

cry/

Yes, the boy is crying.
I think the boy says "stop".

stop/

and:

T-IV: Yeah, how many dogs?

dog brown/ (CC)

The dog is brown.
I didn't say what color.
I said how many dogs?

(Unintelligible response)

Therefore, although the adults reacted to the children with contingent speech in which they provided the correct grammatical structure and lexical forms, they usually redirected the discourse back to their specific focus with subsequent reactions. Whether child responses were contextually contingent, imitative, or noncontingent, the adults usually reacted with linguistically contingent reactions and then either provided the correct answer or repeated their question in some form. Perhaps less verification and modeling of child responses and more incorporation of the content of child utterances into adult reactions would enable deaf children to respond subsequently, that is, to learn to expand discourse over more than one turn.

Child Subsequent Responses

Whether the adult reaction was a question or statement influenced

the tendency, especially for Group II children, for a child to respond subsequently. Group I children responded intelligibly to 50.5% of adult reaction statements and to 57.8% of adult reaction questions while Group II responded intelligibly to 56.9% of the reaction statements and to 75.3% of the questions. No responses were given to 42.3% of the statements and 25.4% of the questions by Group I and to 32.2% of the statements and 14.7% of the questions by Group II. Bloom et al. (1976) found that Stage 1 children gave no responses to 38% of the statements and 32% of the questions while the same children during Stage 2 did not respond to 40% of the statements and 20% of the questions. Bloom's results were computed for overall responses while the observed children's no responses were computed for subsequent responses following adult reactions. However, the proportional distribution of no responses to statements and questions was similar for Stage 2 hearing and hearing impaired children with proportionately twice as many no responses to statements as to questions.

Group II children responded to over 50% of the adult reaction questions with linguistically contingent responses with each child giving more LC than I/Rs subsequent responses and Group I children giving proportionately more I/Rs than LC subsequent responses. These findings indicate that adult reactions influenced the children to respond only within their overall linguistic ability as far as contingency of subsequent response was concerned. There were several exceptions to the above, however. Randy gave more LC than I/Rs utterances to his teacher and Sally more I/Rs to her tutor suggesting that communicative intent of the adult reaction can influence subsequent responses. Tutor A emphasized speech more with Sally and Randy than did their teacher (see p. 172).

The reason that the two children with lowest MLU imitated or repeated

themselves (I/Rs) three times as often as they gave LC responses to questions in their subsequent responses can only be postulated. In their overall responses they were as likely to I/Rs questions as they were to give a linguistically contingent response. It had been previously reported (p. 106) that the proportion of reaction questions to total questions was much lower with the two children. It might be provocative to ask whether more adult reaction questions were Yes/No than Wh- questions. Perhaps with few reactions occurring as questions, when questions did occur, the communicative intent combined with the response strategies of the children resulted in more I/Rs subsequent responses.

When proportions of utterances in total discourse categories occurring as CSRs were compared for the two groups of children, it was reported that all four categories occurred more than 50% of the time for Group II children while only I/Rs and noncontingent (NC) utterances occurred more than 50% of the time for Group I children (see Figure 14, p. 117). It would appear that Group II children were learning to maintain discourse over more than one turn. However, the high proportion of NC responses, especially for Group II children (79.8%) with 81.4% of Sally's NC utterances occurring as subsequent responses, suggests that the present emphasis on interaction which fosters improved syntax and vocabulary does nor necessarily foster the development of language use.

Contingency of the adult reaction on the preceding child utterance also influenced the child subsequent response. For both groups, adult imitations were more likely to be imitated in turn by the child. Folger and Chapman (1978) found that, of all adult speech acts, adult repetitions were most likely to be imitated by the child. They, however, assigned adult repetitions to a separate speech act under the assumption that the

primary function of the mothers' exact imitation was simply to repeat the children. This cannot be assumed in the present study since an adult imitation often was either an indirect request for an imitation by the child or an acknowledgment of the child's message. However, only 1.9% of the imitations of Group II were classified as speech correction, utterances that had been repeated by the adult in attempts to improve speech. Therefore, the finding that Group II children also imitated adult imitations cannot be fully explained and "hearing his own utterance repeated" (Folger and Chapman, 1978, p. 30) may indeed be a cue to imitate. These conclusions, then, concur with Folger and Chapman who refuted Rees' (1975) suggestion that the child imitates when at a loss as to what to do, "rather he imitates when given the pragmatic cue to do so" (p. 36).

The finding that noncontingent utterances of the adults, more than any other category, were responded to with LC utterances by both groups was not expected. However, noncontingent utterances were few and when they did occur, they often suggested a new activity such as turning the page or getting a new toy or going to lunch and as such probably engaged the child's interest.

Adult Interactive Strategies

It had been predicted that adult interactive strategies would not change across or within discourse sessions. Buckler (1978) found that level of thought did not affect the individual teacher's interactive strategies, that is, "manner of teaching was similar whether factual data or abstract thought was the focus" (p. 83). Similarly Erber and Greer (1973) found that although teaching styles varied, individual teachers tended to use a single strategy whenever oral communication

failed between child and teacher.

Buckler's finding that all question types were used at all levels of thought substantiated other studies in which content, structure, and expected response were found to be the important factors in questioning. In the present study, questions were found to serve many functions. The meaning relations and communicative intents influenced the child's responses as did the type of question. While Buckler found questioning techniques to be effective in the development of higher level thinking, in the present study questions focused on factual data and usually involved eliciting old or known information. This was due, no doubt, to a number of factors including the ages of the children, their limited linguistic abilities, the need to elicit utterances which could be understood by the adults, the fact that the adults knew that the children's language was being evaluated, as well as the language-teaching nature of the question-response exchange.

As found in other studies, individual teaching style did not change across or within sessions. Tutor A alone of all of the adults changed strategies for oral interaction during one situation with one child. Instead she used actions, such as holding up toys, to elicit language but maintained a directive style of interaction. Adults who were directive remained directive across children and within sessions. While questioning strategies differed among adults, each adult's strategies remained essentially the same. Teaching strategies included several that appear to be idiosyncratic to teachers of the deaf such as the use of repetitives, antithesis, and the palm out gesture. Whether teachers of children with other language learning disorders also use similar strategies remains to be determined.

To summarize, while teaching styles remained essentially the same

for individual adults, and all adults used strategies that may be idiosyncratic to teachers of the deaf, it was not the case that the linguistic abilities of individual children did not affect certain reactive strategies. Adult MLU corresponsed closely with child MLU. Single words were used more with children in Group I. Children who imitated more were in turn imitated more by the adults. The adults reacted to the form and content of child utterances as indicated by the small proportion of noncontingent reactions and high proportions of topic-related utterances by the adults. In addition, they appeared to be influenced by a child's overall communicative/linguistic ability rather than by specific child utterances. In turn, adult reactions influenced child subsequent responses but only to the extent of the children's linguistic abilities. Discourse development in the hearing impaired children appears to be interdependent rather than dependent upon a particular adult reaction or strategy with linguistic and nonlinguistic context influencing both the child and the adult in the dyadic exchange.

Chapter VI

SUMMARY, MAJOR CONCLUSIONS, AND RECOMMENDATIONS

Summary

The objectives of the study were to investigate both the linguistic relationship between adult and child utterances and the strategies involved in the process of interacting in order to determine some of the influences on discourse development in ten deaf children who were learning language orally. Nine of the children had unaided puretone averages of 90 dB or poorer (ANSI, 1969) and the tenth child's puretone average was 75 dB. Aided puretone averages ranged from 35 dB to 55 dB (see Appendix B). The children, ages 4;8 to 6;5, their four teachers, and two speech and language tutors were videotaped in dyadic exchanges between child and teacher and child and tutor. The adults were instructed to use normal language stimulation and were provided with toys and a sequenced picture story to use with each child. Each session lasted approximately 16 minutes with two sessions analyzed for each child resulting in ten teacher-child and ten tutor-child sessions.

The videotapes were transcribed following the conventions for transcription of videorecordings of child language proposed by Miller, Lifter, Tanouye, and Higgins (1976) by either the investigator and a trained assistant or by two trained assistants who were graduate students familiar with the speech and language of hearing impaired children. Both transcribers agreed upon each word in an utterance for the utterance to be coded as intelligible. All linguistic and nonlinguistic context was

transcribed.

An adaptation of the system of discourse analysis established by Bloom, Rocissano, and Hood (1976) was used to investigate the interrelationships among the utterances of the child and those of the adult. Each child utterance was analyzed first as being adjacent or nonadjacent to an adult utterance and second, if adjacent, for its contingency on the preceding adult utterance. The child utterances that followed adult utterances were analyzed to determine the children's ability to use the information in the adult input utterances to form their own messages Adult reactions were examined to determine both contingency on the preceding child utterance and influence on child subsequent responses.

Mean length of utterance (MLU) was used as a measure of comparison with the children grouped according to Brown's (1973) stages. Group I included subgroup Ia (MLU 1.25-1.46) corresponding to Brown's early Stage 1 and subgroup Ib (MLU 1.55-1.65) comparable to Brown's late Stage 1. Group II (MLU 1.87-2.46) approximated Brown's Stage 2. Adult MLU ranged from 3.42 to 5.72 with mean adult-child MLU differences three morphemes or less.

When the 5,736 adult utterances were examined it was found that, as expected, a very small percentage were either ungrammatical or distorted in some way. An average of 10% of the adult utterances was related to speech production either through indications that the child repeat his own utterance using better speech or repeat a model presented by the adult with emphasis on patterns of connected language or correction of word production. The adults seldom directly requested the children to repeat or improve their speech production, rather, they most often used hand, body, or head movements which indicated to the child that a word or pattern

was to be repeated. Adults in the present study were clearly engaged in what Gleason and Weintraub (1978) called a language-teaching language with much of the adult speech consisting of providing lexical forms and language structures both spontaneously and in reaction to child utterances. Of the total number of adult utterances, 39% were questions and 61% nonquestions or statements.

There were 2,575 intelligible utterances spoken by the children or 31% of the total number produced by all subjects. Child utterances that were nonadjacent to adult utterances plus those that were adjacent but noncontingent comprised 18% of the total child utterances with immediate self-repetitions omitted, indicating that less than one-fifth of the children's speech was spontaneous. Topic-related child discourse, utterances that were contingent or imitative, made up 71% of the total child utterances. Differences in the proportional distribution of types of responses to adult questions and nonquestions were apparent as there were more than five times as many imitative responses to statements as to questions and almost four times as many linguistically contingent responses to questions as to statements. These results exceeded those found in the Bloom et al. (1976) study of young hearing children where differential responses were almost three times greater both for imitative responses to nonquestions and for linguistically contingent responses to questions. Linguistically contingent utterances preserved the verb relation of the adult utterance while in contextually contingent utterances the children responded with another verb that was not subordinate to the adult verb relation. Contextually contingent utterances were relatively infrequent with one-third occurring as semantically inappropriate responses to adult requests.

The predominant form of contingent responses for all groups was add word/phrase with repeat and add responses infrequent even for Group II children. When considered with the finding of high proportions of topic-related speech of which only 12% was contextually contingent, it was concluded that language learning for these hearing impaired children was dependent upon the form of the adult input message to an extent not found with hearing children. In addition it is evident that learning to respond contingently involves learning to respond to nonquestions by more than repeating and to questions by more than adding.

Group II children responded with proportionately twice as many linguistically contingent utterances as Group I while Group I children imitated adult utterances more than twice as often as Group II. The highest proportion of imitations for both groups was of the most recent word or words; however, Group II children imitated selectively for almost 50% of their imitations and more than twice as often as did Group I. This suggests that the ability to imitate precisely does not lead to the development of more mature language. Rather, the ability to select constituents and constituent relations to imitate would seem to reflect increasing linguistic development.

The two children with the lowest MLU imitated questions as often as they responded to questions with linguistically contingent responses, and it was noted that they gave minimal oral or nonoral yes/no responses to questions. Results of examination of the question categories imitated revealed that they imitated Yes/No and intonated questions three times as often as Wh- questions suggesting that imitation of Yes/No questions might be a response strategy for some deaf children.

The adults seldom changed the topic in their immediate reaction to child utterances; however, 13% of their reactions were coded as self-contingent indicating, in these cases, that the adult did not overtly acknowledge the child's message but referred back to her own preceding message. They responded to the form and/or content of the child message 76% of the time that a reaction was possible with more no reactions in response to the children with more spontaneous speech. While the high proportion of topic-related reactions might indicate that the adults were following the lead of the children most of the time, such was not the case. The adults consistently redirected the focus of the discourse in subsequent reactions whenever child responses were not acceptable. Variations were found among adults across children and across categories of child utterances for reactions that repeated child utterances. In general, reactions that repeated the child message in any way were more frequent than reactions which did not repeat with the children in Group I repeated proportionately more than those in Group II. The adults repeated and expanded the language of both groups of children equally with children's spontaneous utterances receiving highest proportions of expansions, their contingent utterances next, and imitations last. It was concluded that the adults reacted to the children's overall linguistic/communicative abilities rather than to specific child utterances or single measures such as MLU or frequency of imitation.

Several factors including type of adult utterance (question or statement), contingency on the preceding child utterance, as well as the communicative intent of the adult reaction influenced the contingency of the child subsequent response but only within the child's linguistic ability. Adult imitations of child utterances were in turn more likely

to be imitated by both groups of children. It was concluded that the children had difficulty in maintaining discourse over more than one turn suggesting that language use be an integral part of any language learning program.

While teaching styles remained essentially the same for individual adults and all adults used strategies that may be idiosyncratic to teachers of the deaf, adult interactive strategies were influenced by the linguistic/communicative abilities of individual children.

Major Conclusions

1. Learning language in context is necessary for hearing impaired children whose limited auditory abilities preclude language being "overheard". It has been concluded that it is easier for young hearing children to form spontaneous messages than it is for them to form messages related to the topic of adult utterances (Bloom, Rocissano, and Hood, 1976). The results of the present study indicate that the hearing impaired children were dependent upon the form of the adult input message for formulating their own messages to an extent not found with normally hearing children. It is suggested that the dyadic exchange is a viable one for enabling the hearing impaired child to learn the rules of discourse and to form messages contingent on the form of the adult message. In addition, while contrary to the sequence for normally hearing children, the dyadic exchange might be essential for the deaf child's learning to form messages related to the content of the input message. As hearing impaired children become more proficient in responding to adult messages, their ability to form spontaneous messages and to initiate discourse should increase accordingly.

2. The question of the use of imitation as a teaching/learning strategy concerns not its efficacy for language learning but how it can be most effectively used with deaf children. The ability to imitate precisely, that is, to imitate all linguistic elements in an utterance, does not appear to lead to the development of more mature language. Rather, the ability to select constituents and constituent relations to imitate would seem to reflect increasing linguistic development.

3. Responding to nonquestions with other than imitations was a difficult task for the hearing impaired children. It is evident that learning to respond contingently involves learning to respond to nonquestions by more than repeating and to questions by more than adding.

4. The difficulty evidenced by the children in maintaining discourse over more than one turn suggests that the present emphasis on interaction which fosters improved syntax and vocabulary does not necessarily foster the development of language use. Perhaps less verification and modeling of child utterances and more incorporation of the content of child messages into adult reactions might enable deaf children to respond subsequently, that is, to expand discourse over more than one turn.

5. Discourse development appears to be interdependent rather than dependent upon a particular adult reaction or strategy with linguistic and nonlinguistic context influencing both the adult and the child in the dyadic exchange.

Recommendations

1. In order to determine appropriate intervention procedures, the following developmental areas have been identified for further investigation in normally hearing and hearing impaired children:

   1.1 Origins and sequence of development of pronominal recoding.

   1.2 Strategies for responding to Yes/No questions.

   1.3 Developmental use of pro-verbs, especially "do".

   1.4 Pragmatic rules for learning to maintain discourse over more than one turn.

2. Experimental investigation is suggested in the following areas in order to facilitate discourse development in young deaf children:

   2.1 Strategies for effective question-response exchanges.

   2.2 Techniques for teaching deaf children to respond contingently to nonquestions.

3. It is suggested that implementation techniques for encouraging contingent responses include the following:

   3.1 The use of imitation, not for precise repetition of all linguistic elements, but to enable deaf children to learn the relationships between form and content of language.

   3.2 Expansion of child initiated imitations.

   3.3 Emphasis on constituents to be repeated, such as the verb in locative action utterances and the actor or agent in action utterances, as deaf children begin to repeat and add.

4. It is suggested that the present study be replicated with deaf children using other communication modes. It is possible that the interaction strategies and relationships among utterances might not be the same in educational settings where children and adults use modes of communication other than auditory-oral.

5. Children with less than severe to profound hearing loss might well be included in language research of hearing impaired children in order to better determine the influences of differing aided and unaided hearing levels on language development. A continuum of development might be discovered that would aid in the planning of individualized language programs.

6. A language curriculum might be written with discourse as the focus for language learning for young hearing impaired children with their parents and teachers. Incorporated could be procedures for using interactive strategies such as imitation and question-response exchanges, for responding contingently to nonquestions, for the use of pro-verbs, and for the development of the form of children's utterances so that imitation might develop beyond mere repetition as deaf children learn to respond to messages by repeating, adding, and recoding. The ability to form spontaneous messages and to initiate discourse should increase as hearing impaired children become more proficient in responding to adult messages.

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APPENDIX A

Profiles of Individual Children

Name	Sex	C.A. yrs.	C.A. mos.	IQ[a]	Etiology of Deafness	Age of Onset	Age When Began Hearing Aid Use
Martin	M	4	8	138	Unknown	Congenital	2 yrs.
Betty	F	4	8	125	Endogenous	Congenital	1 yr. 7 mos.
Randy	M	4	10	100[b]	Endogenous	Congenital	8 mos.
Kathy	F	5	0	124	Unknown	Congenital	2 yrs. 6 mos.
Art	M	5	2	101	Respiratory Infection (?)	6 - 7 mos. (?)	2 yrs. 4 mos.
Sally	F	5	4	111	Unknown	Congenital	3 yrs.
Danny	M	5	6	100	Unknown	Congenital	3 yrs. 6 mos.
Iris	F	5	6	-[c]	Unknown	Congenital	3 yrs.
Valerie	F	5	8	109	Endogenous	Congenital	2 yrs. 9 mos.
Debbie	F	6	5	128	High fever (?)	18 mos.	2 yrs. 6 mos.

[a]Merrill-Palmer IQs
[b]WPPSI IQ
[c]IQ score not reported for Iris; narrative describes performance as superior form perception and utilization of visual-kinesthetic feedback with visual motor coordination above normal.

APPENDIX B

Hearing Levels of Individual Children (ANSI 1969)

	Unaided Hearing Levels										Aided Hearing Levels				
Name	PTA	RE:	500	1000	2000	4000	LE:	500	1000	2000	4000	500	1000	2000	4000	PTA
Martin	93		90	105	85	↓[a]		90	105	105	↓	45	45	45	45	45
Betty	102		95	110	↓	-		95	110	↓	-	40	55	70	-	55
Randy	95		↓	↓	↓	↓		85	100	100	100	*	*	*	*	*
Kathy	100		100	↓	↓	↓		105	↓	↓	↓	45	55	55	-	52
Art	98		90	100	105	↓		100	110	↓	↓	40	50	45	55	45
Sally	75		65	80	80	80		65	80	80	75	35	40	40	35	38
Danny	90		85	95	100	95		80	100	90	↓	25	35	45	50	35
Iris	100		95	105	↓	↓		100	105	↓	↓	45	40	55	-	47
Valerie	93		90	100	110	↓		85	100	95	↓	25	50	40	45	38
Debbie	100		100	100	↓	↓		110	110	↓	↓	40	40	40	60	40

[a]Legend: * aided audiogram not reported
- response/no response not reported
↓ no response at limits of audiometer

APPENDIX C

Description of Toys

The following toys were available for each individual teacher/child and tutor/child session:

Fisher Price airplane with four peg people and two suitcases

Fisher Price circus including animals and peg people

Fisher Price dollhouse including furniture, family, car, and dog

Sunshine family with mother, father, and baby

Small cradle and baby bottle

Plastic car and boy doll

Childcraft table top blocks

Small wooden train set consisting of five cars and eight pieces of curved track - Skaneateles train

Hand puppets: boy and policeman

Farm animals and barn

Six Picture Sequence Story

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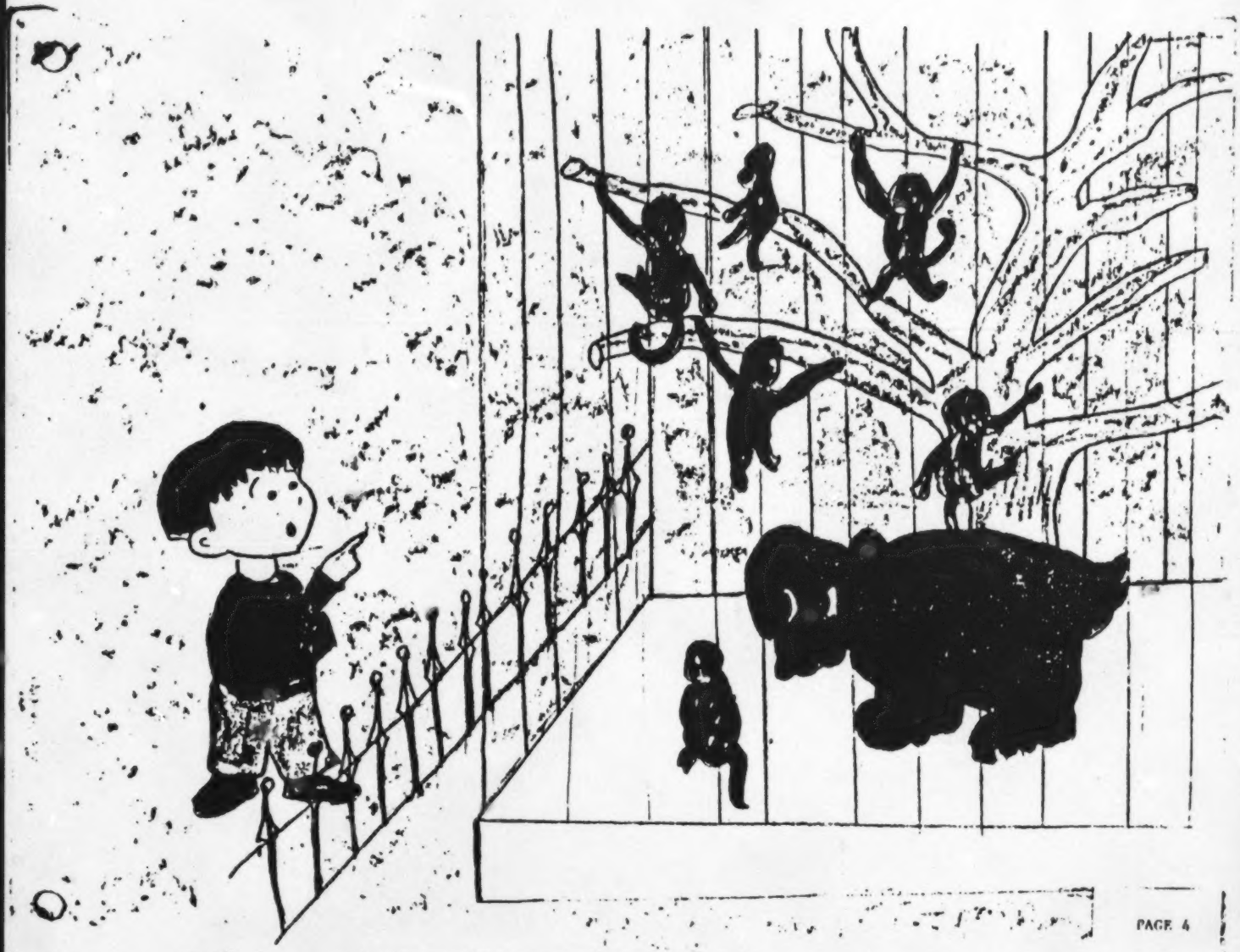
PAGE 3



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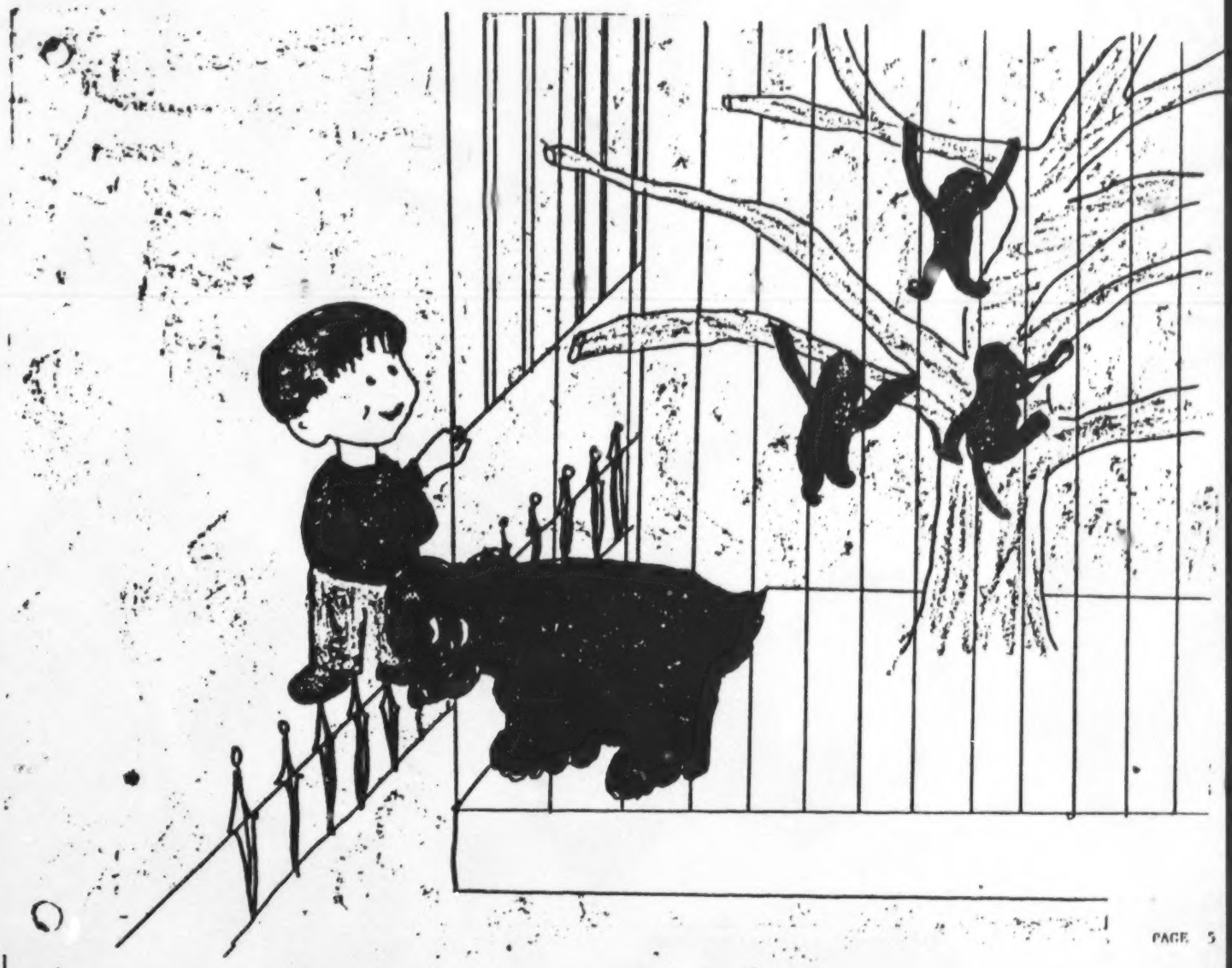

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APPENDIX E

Instructions to Teachers and Tutors: 15-minute Videotaped Language Lesson

Dear _____

Please use the session as you would a language lesson. Interact with the child as you usually do in order to stimulate language. I shall be obtaining samples of the children's language through video and audio taping and shall be analyzing their language in general. I am also interested in the children's use of hearing as reflected by the suprasegmental features of their speech.

The toys should be used first with the children, whichever ones and however you wish. At the end of eight (8) minutes, I will signal and you should then use the story, again however you wish. When you have finished with the story, go back to the toys for any remaining time.

Remember to interact with the child as you usually do in order to stimulate language.

Thank you for your participation.

Daphne Fox

APPENDIX F

Instructions to Teachers:
One-half Hour Videotaped Classroom Session

Dear _____

I shall be obtaining samples of the children's language as they participate in regular classroom activities. Each child in the study will be videotaped for ½ hour and your interaction with the child during this time is requested. Please try to have only one adult at a time speaking to the child during the time that he/she is being videotaped.

You have indicated that the following times will be satisfactory:

Thank you again for your time and interest.

Daphne Fox

APPENDIX G

Conventions for Transcribing Video-Recorded Child Language Data

P. Miller, K. Lifter, E. Tanouye, L. Higgins, Teachers College, 1976

1. The aim is to transcribe all speech by the child (column 2) and to the child or within his hearing (column 3), to describe the accompanying nonverbal behaviors of the child (column 1) and of the others speakers (column 4), and to record information about the context in which the verbal and nonverbal behaviors occur (column 4). The format is illustrated below. Persons other than the child are identified by an initial (e.g., D for Debbie). Descriptions of nonverbal behaviors and context are enclosed in parentheses.

column 1	column 2	column 3	column 4
child behaviors	child utterances	utterances of other speakers	context and behaviors of other speakers
(S accepting block)	block/	D: here's the block/	(D giving block to S)

2. Nonverbal behaviors consist primarily of actions and gestures. The abbreviation [gs] is used for gestures followed by a description of the type of gesture.

e.g., ([gs] arms straight up over head)

Facial expressions may be included, but this is optional.

3. The temporal ordering of utterances and behaviors is represented in the following ways:

(a) utterances or behaviors occurring simultaneously appear on

the same line; simultaneous behaviors performed by the same person appear on the same line separated by commas.

(b) utterances or behaviors occurring successively appear on successive lines.

1	2	3	4
		M: where's your truck?/	(M entering room)
(putting block aside)	on table/		
(approaches table, smiles)			

4. Direction of the child's gaze is noted whenever possible, using the following set of symbols:

(a) gaze directed towards an object: [doll]

(b) gaze directed towards a person: [D], where D is the person's initial.

(c) gaze directed towards camera: [•]

(d) shifting gaze: [~]

(e) can't be determined: [?]

Each utterance is followed immediately by one of the above symbols, indicating the direction of gaze that accompanies the utterance. "Accompanies" is defined as "roughly simultaneous" with the utterance. Finer temporal discriminations (e.g., shift of gaze immediately prior to onset of utterance vs. during utterance) are not made.

1	2	3	4
(stringing beads)			
(turning tow. M) want cookie/[M]			
		M: you want a cookie?/	(M sitting at table)

5. OPTIONAL: Record direction of gaze of other speakers, using procedures in #4 above.

6. Direction of child's gaze following (in response to) another speaker's utterance is noted whenever possible, immediately following the speaker's utterance.

(a) gaze directed towards an object: (doll)

(b) gaze directed towards a person: (D), where D is the person's initial.

(c) gaze directed towards camera: (•)

(d) shifting gaze: (~)

(e) can't be determined: (?)

1	2	3	4
		where's the book?/ (table)	
(C approaching table/ (table) table)			

In the above example table and table represent the same information (indicated by arrow) but this is not always the case as in the following example:

1	2	3	4
		where's the book/? (table)	
(C approaches table)			
(C picks up book)			

7. Pointing gestures made by the child are represented as follows, with the direction of the gesture enclosed in parentheses:

(a) pointing towards an object: (cup) →

(b) pointing towards a person: (K) → where K is the person's initial.

(c) pointing towards camera: (•→)

(d) can't be determined: (?→)

If a pointing gesture accompanies a child utterance, the appropriate symbol is written above the utterance in column 2. "Accompanies" is defined as "roughly simultaneous" with the utterance. Finer temporal discriminations (e.g., pointing immediately prior to onset of utterance vs. during utterance) are not made.

1	2	3	4
(walking tow. ball)	(ball) ball→		

If a pointing gesture does not accompany a child utterance, the appropriate symbol is written in column 1, along with other nonverbal behaviors.

1	2	3	4
(putting cookie to doll's mouth)	baby eat/		
(turning tow.	(juice) juice→)		

↖ action and pointing ↗ are simultaneous

1	2	3	4
(putting cookie to doll's mouth)	baby eat/		
(turning tow. juice			
((juice)→)			

↖ action and pointing ↗ are successive

8. OPTIONAL: Record pointing gestures made by other speakers, using procedures in #5 above.

Recording Utterances:

1. An idiosyncratic pronunciation of a word is indicated with an *.

1 2 3 4

truck/* where "truck"
is pronounced "kuk"

2. An adult's misinterpretation of child's utterance is indicated with a check.

1 2 3 4

wait a minute/
want mine✓

3. Guesses about the form of unintelligible utterances are followed by a question mark enclosed in parentheses above the utterance:

1 2 3 4

(read book?)
---/

The following list includes frequently used descriptive terms:

(a) inspect - to explore visually.

(b) examine - to explore visually and manually.

(c) extend - to hold out arm at shoulder level, with or without an object; often an object is extended towards someone in a "display" or "showing" gesture.

(d) give - to transfer an object from the giver's hand to a recipient; "give" is distinguished from "extend" as follows: (1) an object is always involved; (2) the action is "completed", i.e., another person received the object.

Miscellaneous:

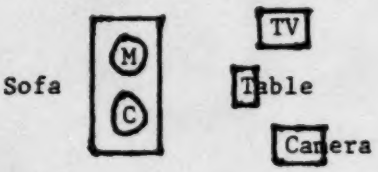
1. An arrow is drawn from one line to the next when an utterance is too long for the space provided.

1	2	3	4
		do you want to go to the zoo?/	

2. The exact repetition of a nonverbal behavior is indicated by "X" enclosed in parentheses. If the actor is someone other than the child, the actor's initial is also given.

1	2	3	4
(shakes bear) (X)	bear/	poor bear!/	(M shakes head negatively) (M X)

3. A small diagram of the room and of the subjects' positions relative to one another is drawn at the top of each page.



Addendum to Notation Conventions

1. An open circle is placed above an utterance to indicate lack of voice.

o
monkey/

2. A line through a letter indicates that a phoneme is present where an inflectional ending is required, but the phoneme produced is distorted.

clothe$/

3. A colon is used to indicate that an utterance or word is drawn out.

fall:/

4. When a child utterance seems to be a question because it has rising intonation, it should be followed by a rising arrow (↑) rather than a question mark.

no more↑/

5. A slash should be used to mark the utterance boundary for children's utterances.

dog run way/

6. When a child or other speaker suddenly interrupts his own utterance, apparently leaving the utterance unfinished, a line ____ indicates the abrupt stop.

Can you tell me ____/

7. An unintelligible utterance or portion of an utterance is indicated by dashes, one dash for each syllable. If possible, a phonetic transcription is used instead.

boy ---- run

8. The symbol T.O. is used whenever the adult speaks at the same time as the child, talks over the child's utterance.

APPENDIX H

Semantic-Syntactic Categories

ACTION

Utterances in this category referred to two kinds of movement where the goal of the movement was not a change in the location of an object or person (see Locative Action).

1. Utterances referred to action that affected an object with movement by an agent.

2. Other action utterances referred to movements by actors (persons or objects) in events where no object other than the actor was affected.

LOCATIVE ACTION

Utterances in this category referred to movement where the goal of movement was a change in the location of a person or object.

LOCATIVE STATE

Utterances in this category referred to the relationship between a person or object and its location, where no movement established the locative relation within the context of the speech event, that is, before, during, or after the child's utterance.

NOTICE

Utterances in this category referred to attention to a person, object, or event, and necessarily included a verb of notice such as "see" or "hear".

STATE

Utterances in this category made reference to transitory states of affairs involving persons or other animate beings: either (1) an internal state, or (2) a temporary state of ownership or possession. State verbs also included feelings of emotion and verbs such as "sleeping".

EXISTENCE

Existence or identification entailed pointing out or naming an object or person.

OTHER CATEGORIES:

Attribution - counting, shapes, size, color of objects or persons.

Recurrence - another instance of an object or event.

Possession - ownership, possessor.

Affirmation - acknowledging, affirming, confirming.

Negation - nonexistence, disappearance, or rejection.

ADDED CATEGORIES FOR PRESENT STUDY:

Completion - to indicate that an event is finished.

Social - greetings, routines.

Sound - sounds of toys or animals or crying sounds.

Abstracted from Bloom, L., Lightbown, P., and Hood, L. Structure and Variation in Child Language. Monographs of the Society for Research in Child Development, 1975, 40 (Serial No. 160)

APPENDIX I

Discourse Analysis: Child Utterances[1]

NON ADJACENT UTTERANCES:

Non Adjacent speech consisted of those child utterances that occurred without a previous adult utterance or with a definite pause after a previous adult utterance.

Repeat Self Immediately speech consisted of those child utterances in which the child repeated himself exactly or in reduced form, with no adult utterance occurring between the child's utterance and his immediate self-repetition. An adult action may or may not have elicited the immediate self repetition, for example:[2]

(Tu-A pointing to the boy in the book and saying to Martin:)
Look.

boy/

(Tu-A pointed again to the boy)

boy/ (Repeat self immediately, adult eliciting action)

and:

(Tu-B holding page up and saying to Danny:)
What should I do?

---

[1]Adapted from Bloom, L., Rocissano, L., and Hood, L. Adult-child discourse: Developmental interaction between information processing and linguistic knowledge. Cognitive Psychology, 1976, 8, 521-552.

[2]Utterances on the right were spoken by the child and those on the left by the adult. Information on the left in parentheses describes the context. Child utterances begin with lower case letters with utterance boundaries indicated by a slash (/) with the exception of Wh- questions for which a question mark (?) is used and rising intonation utterances which end with a rising arrow (↑).

open door/
open door/ (Repeat self immediately, no adult eliciting action)

ADJACENT UTTERANCES: Adjacent speech consisted of those child utterances that occurred after an adult utterance.

Non Contingent (NC) speech consisted of those child utterances that did not share the same topic as the preceding adult utterance and included child requests for the adult to "watch" or "look" at something the child was doing, as well as utterances in which the child began talking about another toy or part of the story that was not related to the topic of the adult utterance, for example:

(Tu-B holding up peg doll)
What's this?

(Danny putting table in the kitchen of doll house) to eat/ (NC)

Repeat self (Rs) speech consisted of those child utterances in which the child simply repeated his own preceding utterance, either exactly or in reduced form, with an adult utterance(s) occurring between the child's utterance and his self-repetition, for example;

(T-II picks up Mommy doll and says to Kathy:)

What does this look like, Kathy?

Mommy ↑

Mommy/

Mommy/ (Rs)

and:

(Tu-A touching airplane and saying to Martin)
Make it fly.

fly/

Make it fly.

(Martin putting hand on airplane) fly/ (Rs)

To be coded Rs the intervening adult utterance could not have been an indication to the child that he repeat himself for the purpose of correcting his speech. Repeat self utterances may or may not have shared the topic of the adult intervening utterance and, in either case, were not included in the analysis of topic-related speech.

Imitations consisted of those child utterances that shared the same topic of the preceding adult utterance by repeating part or all of the adult utterance without the addition of a word(s), for example:

(T-II talking to Art about the story)
The dog ran away.

ran way/ (I)

An utterance was also coded as imitative if it changed the verb tense or morphological ending of a word, for example:

(T-III commenting about the doll to Debbie)
The girl woke up.

girl wake up/ (I)

or changed a verb to a repetitive, for example:

(Tu-A describing the boy and dog in the story to Iris)
They're walking.

walk, walk/ (I)

or changed the intonation pattern, for example:

(T-I telling Sally that the
session would soon be over)
A half minute longer.

longer ↑ (I)

An utterance was coded as imitative if there were three or fewer utterances between the adult model and the child's imitation.

Contingent speech consisted of those child utterances that both (a) shared the same topic with the preceding adult utterance, and (b) added information to the preceding adult utterance.

Linguistically Contingent (LC) child utterances were related by topic to the preceding adult utterance and either preserved the same verb relation or added a subordinate verb relation. There were eight subcategories of LC speech: yes/no, recode, alternative, choice, expansions, clarification request, and other.

Yes/no utterances were forms of "yes" and "no" responses to questions including "I don't know" and included expressions of acknowledgement or negation in response to adult statements, for example:

(Randy engrossed in putting two small ladders
together, T-I trying to attract his attention)

(T-I holding toy lion close to Randy)
Randy look, what's this?

(Randy playing with ladders)

I'll wait until you put it together.

(Randy looks at T-I)

(I'll wait.)

(Randy looking back at ladders, trying to put them together) all right/ (LC; yes/no)

Yes/no responses were considered LC whether or not they were correct responses.

Recodings were child utterances that repeated part or all of the adult utterance and changed the form from noun to pronoun or shifted pronominal reference from the adult to the child utterance, for example:

(Valerie playing with the beds in the dollhouse)

Which, which bed do you want?

three/

You want all three ↑

(Val nodding)

I want three/ (LC; Recode)

All right, take the beds and put them in the house.

Alternative responses were those that opposed a part of the adult utterance while preserving the same verb relation, for example:

(Valerie playing with table top blocks)

Ah, what's that?

(triangle)
square triang/

Is it a small one?

big/ (LC; Alternative)

and:

(Val continues playing with the table top blocks)

(T-IV running finger along edge of diamond shape block)

It's a square.

(Val shaking head)

a diamond/ (LC; Alternative)
diamond/

A diamond.

Choice utterances occurred when more than one alternative was presented to the child in the preceding adult utterance(s) and the child responded with one of the alternatives, for example:

(Tu-A and Art looking at the page in the book where the boy finds his dog)

(Tu-A pointing to the boy, moving own head from side to side for emphasis)
Is the boy sad?
Is he happy?
Is he surprised?

happy/ (LC; Choice)

He's happy, that's right.

Expansions were those child utterances in which the child added information to the adult's preceding utterance within the same clause structure and with the same or subordinate verb relation. There were several types of expansions which included Wh- replacements and additions of a major subject-verb-complement constituent that did not occur in the adult utterance or modification of a major constituent that was present in the adult utterance. In addition there were several subcategories of Wh- replacements, for example those that were noun or attribute specified by the adult:

(TU-A picking up the airplane and pointing to it)
What's that?

airplane/ (Wh- replacement: object specified by adult)

and:

(Tu-A and Kathy looking at the book)

What color shirt does he have on?
What color shirt?

(Kathy moving hand back and forth on book, palm up) — orange/ (Wh- replacement; attribute specified by adult)

In addition there were Wh- replacements that were nonspecified,

for example:

(Tu-B telling Valerie to choose another toy)

Do you wanna pick another toy?
Do you wanna get another toy?
Get something different.
What would you like to play with?

the house/ (Wh - replacement: object not specified by adult)

There were also Wh- replacements for pro-verbs, usually "do",

"say", or "what happened?", for example:

(Martin playing with the toy car; T-I has modeled the words, "gas pedal", and Martin imitated "gas pedal")

What does it make the car do?

(Martin nodding, running hand along table) — go/ (Wh- replacement; pro-verb)

and:

(T-III and Debbie looking at the page in the book where the boy finds the dog in the monkey cage)

(T-III pointing to page)
What happened?

(Debbie running finger over page) — ➲ found dog monkey/ Wh- replacement: pro-verb

There were also Wh- replacements in which the child replaced the Wh- word with a different relation than that requested. However, the replies were semantically appropriate in that they gave the function, possessor, or attribute of the object, for example:

(Iris playing with stairs from dollhouse)

(T-II taking stairs from Iris)
What are they?

up, up/ (Wh- replacement: different relation - function)

Examples of Additions or Modifications of Constituents are as follows:

(Tu-B gives doll to Danny)

Make him walk.

(Danny pulling stairs out)

walk here/ (Addition of constituent)

and:

(Sally putting the baby in the mommy's arms)

(Tu-A saying in a singsong voice)
/a:/ baby.

(Sally moving mommy and baby in air, saying in a singsong voice)

/a:/ my baby/ (Modification of constituent)

Clarification Requests were those child utterances in which the child asked "what?" or "huh↑" to indicate that he had not heard or had not understood the adult utterance, for example:

(T-I trying to get Randy to guess
waht animal she is hiding in her hand)

(T-I shaking head, extending fingers
toward Randy's arm)
Not a lion.

what? (LC, Clarification Request)

(T-I shaking head)
It's smaller than a lion.
It's not as big as a lion.

tiger/

Other utterances were those LC responses that did not fit any of the other categories.

Contextually Contingent (CC) speech preserved the topic of the adult utterance by either expanding on or presenting an alternative to the idea in the adult utterance with a different verb relation. Subcategories were coded as alternatives, expansions, other, or undetermined.

Contextual alternatives opposed the idea represented in the adult utterance with a different verb relation, for example:

(Sally holding up the button at
the end of the string on the
airplane, twisting it)

look/

Is it broken?

no, it turn around/
(CC; Alternative)

It turns around, that's right.

Contextual expansions added a different verb relation that was related to the topic of the adult utterance and usually referred to successive aspects of the situation, for example:

(Val taking peg doll out of bed in the dollhouse) — up/

Okay, Daddy woke up, okay.

(Val walking doll down the stairs) — downstair/ (CC; Expansion)

and;

(T-I modeling dialogue for the story)
My dog is lost.

yes/
go away/ (CC; Expansion)

Other utterances were coded as contextual expansions when the adult speech contained a notice verb and the child responded appropriately, for example:

(T-II point to "happy face" on back of toy car)
Look at this

happy/ (CC; Expansion)

Yes, the face is happy.

or the adult utterance contained an open-ended request such as:

(T-I introducing the story)
Do you know this story?
Tell me about it.

(Martin pointing out with his thumb, making a holding gesture) — boy dog there holding/ (CC; Expansion)

or the adult utterance was an expletive with accompanying actions and the child utterance responded to the actions, for example:

(Tu-A holding up the toy dog to Martin) — dog/

A dog.
Oh, that was good.

(Tu-A putting dog down and holding up a toy chicken)
Oh!

chicken/ (CC; Expansion)

or the child responded to the adult action rather than to the adult utterance, for example:

(Betty begins to tell the story)

(Tu-A pointing to the monkey and talking sotto voce)
She's telling me the story already.

(Betty pointing to the monkey) (monkey) mong/ (CC; Expansion)

or the child negated the adult's action:

(Danny directing the tutor's actions as she walks the doll up the stairs and into the bedroom of the dollhouse) down sleep/

(Tu-B putting doll in bed)
Okay.

(Danny reaching for doll) no/ (CC; Expansion)

Contextual expansions also included child responses that provided a different relation than that requested by the adult utterance and which differed from LC different relations described previously (p. 249) as giving an attribute, possessor, or function that was considered semantically appropriate to the adult utterance. Contextually contingent different relation responses, while appropriate to the nonlinguistic context, were not appropriate to the specific lingusitic context. Contextually contingent, as well as linguistically contingent different relations followed adult questions, for example:

(T-II pointing to the boy who is crying and talking to the policeman in the story)
What do you think the boy says?

(Art pointing to own eye) cry/ (CC; Expansion, different relation)

and;

(Tu-A pointing to the policeman
in the book)
Who is that?
Who is that?

(Sally imitating police-
man with palm facing out) stop/ (CC; Expansion, different relation)

Contextually contingent utterances were coded other if the child responded to the adult utterance by saying "wait" while continuing ongoing actions or uttered an exclamation related to the topic. An undetermined contextually contingent response was related to the topic of the preceding adult utterance but meaning could not be determined from the context.

Form of Contingent Utterances. There were eight LC and five CC form categories which included Yes/No (LC), Repeat (LC), Add Word/Phrase (LC & CC), Add Sentence (LC & CC), Repeat & Add (LC & CC), Recode/Recode & Repeat (LC), Recode & Add (LC & CC), and Recode & Repeat & Add (LC & CC).

Yes/No utterances were forms of "yes" and "no" responses to questions including 'I don't know" and included other expressions of acknowledgement and negation.

Repeat utterances were those in which the child either repeated one of an alternative when given a choice by the adult, for example:

(Iris playing with a doll)
Is she a big girl or a little girl?

(Tu-A covering own mouth)
Is she big or little?
little/ (Repeat)

or when the word repeated by the child was the first word in a series of single word utterance (SSWU), for example:

(Val attempting to put two pieces of train track together)

Do you want me to help you?

help/ (Repeat)
please/

Help me please.

and;

(Tu-A and Art looking at the book; Tu-A pointing to the boy's shirt)
What color is his shirt?

shirt/ (Repeat)
orange/

In Add Word/Phrase utterances a word or phrase either added or replaced a constituent in the adult utterance, for example:

(Art playing with the car)

Is that a blue car?

red/ (Add Word)

Red, good boy.

and:

(Debbie takes a boy peg doll out of the airplane, walks him down the stairs)

(Tu-B looking in the airplane)
Oh, I see something else.

(Debbie taking another boy peg doll out of the airplane)

two boy/ (Add Phrase)

and,

(Iris has called the barn a house
and Tu-A says)
Whose house?

horse/ (Add Word)

and:

(Danny playing with the dollhouse)

(Tu-B holding peg doll and moving
him back and forth in front of the
dollhouse)
What do you want him to do?

(Danny pushing bed back in
the bedroom) go to sleep/ (Add Phrase)

In Add Sentence utterances, the child added two or three major constituents, for example:

(Tu-B and Val looking at the page in
the book where the boy is looking at
the dog in the monkey cage)

(Tu-B pointing to book)
What do you think is going to
happen?

dog open door out/
(Add Sentence)

and:

(Tu-A and Randy looking at page in
the book where the dog has run away
and the boy is crying) boy crying/

(Tu-A palm out)
Yeah, why is he crying?

(Randy moving hand out from book) the dog go way/
(Add Sentence)

Repeat and Add utterances consisted of a repetition of part of the adult utterance with the addition or replacement of a word or phrase in the adult utterance, for example:

(Tu-A and Betty discussing Betty's trip on an airplane)

Where did you go when you went on an airplane?

(Betty moving hand from self out) — go far way/ (Repeat & Add)

and:

(T-II and Iris looking at the page in the book where the dog is running away)

(T-II moving hand in circle over dog in book)
What did the dog do?

dog run/ (Repeat & Add)

and:

(The doll has fallen into Tu-A's lap and she says to Sally:

Where's the girl?

(Sally pointing to Tu-A's lap) — girl go over here/ (Repeat & Add)

Recode/Recode & Repeat utterances were those in which a noun or pronoun in the adult utterance was recoded or recoded and other lexical items repeated (See example under type of LC utterances, p. 246).

Recode and Add utterances included recodings and additions, for example:

(Tu-A and Sally talking about the pilot of the airplane)

What does the man do?

(Sally moving hands in air as though driving) — he drive car/ (Recode & Add)

Utterances were also considered Recode & Add if a child recoded a noun or pronoun and added rising intonation, for example:

(Sally playing with the airplane which has peg dolls and toy suitcases)

(Tu-A holding up a suitcase)
What's this?

(Sally taking suitcase) — that ↑ (Recode & Add)

and:

(Danny looking at the page in the book which displays monkeys in a cage)

(Tu-B pointing to Danny)
Are you a monkey?

me ↑ (Recode & Add)

Recode & Repeat & Add utterances consisted of recoding, repetitions and additions to the adult utterance, for example:

(Danny reaching in the dollhouse for a bed and Tu-B says:)
Where do you want to put it?
Do you want to put it over there?
Go ahead, you do it.

(Danny moving bed from one bedroom to another) — I want put here/ (Recode & Repeat & Add)

and:

(Sally finished playing and climbed over the table and T-I said:

Where are you going?

I going home/ (Recode & Repeat & Add)

APPENDIX J

Discourse Analysis: Adult Reactions[1]

The immediate adult reaction following and adjacent to a child utterance is designated an adult reaction and is categorized in one of five mutually exclusive categories:

Linguistically Contingent (LC)

1. If adult asks child to repeat even if indirectly.
2. If adult repeats child with rising intonation (↑).
3. If child gives correct answer and adult utters a statement or question using the previous adult pattern but with a different object, for example: "and how about this?".
4. If adult comments on child's speech.
5. If adult acknowledges or reinforces child's utterance.
6. If adult acknowledges child's imitation and repeats and expands or models.
7. If child answers "yes" or "no" to a question and adult continues on same topic with same or subordinate verb.
8. If adult provides a subordinate verb, for example:

   child: go here/
   adult: you're putting it there.

   child: no more/
   adult: we're finished.

9. If adult repeats and expands child using child's verb or subordinate verb.
10. If child utterance is one word or in an utterance without a verb and adult repeats and expands adding a verb.

[1]Adapted from Bloom, L., Rocissano, L., and Hood, L. Adult-child discourse: Developmental interaction between information processing and linguistic knowledge. Cognitive Psychology, 1976, 8, 521-552.

11. If adult extends topic to child's experience.

12. If adult expands child's single word utterance.

13. If adult repeats and expands child without a verb unless adult is opposing idea of child.

14. If child imitates and adult repeats and expands child utterance with more than a word ending, article, or completion of child's word.

Contextually Contingent (CC)

1. If adult continues on same topic as child's utterance but uses a different verb relation.

2. If adult utterance is open-ended, for example "let's see", or "What else?" in reaction to a child utterance.

3. If adult talks about child's actions if also related to the topic of child's utterance.

4. If child answers with "yes" or "no" and adult continues on own topic but with a different verb relation.

5. If adult corrects child's verb, for example:

   adult: What should I do?
   child: open door/
   adult: Turn the page.

6. If adult continues on same topic but says "What should I do?" with ongoing activity (not a new activity).

7. If child imitates and adult acknowledges imitation and continues on own topic but with a different verb relation.

8. If adult corrects child, child imitates correction, and adult continues on same topic but with a different verb relation.

Imitation (I)

1. If adult repeats child exactly, or reduced, or adds an article, word ending, or completes the word.

2. If adult repeats child to elicit or model for better speech but does not add anything except an article, word ending, or completes the word.

Self Contingent (SC)

1. If child imitates and adult's next utterance is a question or statement on own topic; but does not acknowledge child's imitation.

2. If child imitates and adult answers own question.

3. If child imitates and adult repeats own previous question or statement.

4. If child answers the adult and the adult repeats own previous utterance.

5. If adult calls child's name or other attention getting device to get child's attention to own topic (not a new topic but topic of adult's previous utterance).

6. If adult models and instead of imitating, the child says "yes" or "no" and the adult continues on own topic.

Non Contingent (NC)

1. If adult introduces a new topic; does not share topic of child's utterance.

2. If child imitates adult and adult introduces a new topic from that of adult's previous utterance.

3. If adult begins talking about another toy or part of the picture that is not related to topic of child's utterance.

4. If adult talks about turning the page, or getting a new toy or time for lunch, etc.

APPENDIX K

Parental Permission Form

Dear Mr. and Mrs._____,

Please sign and return to me in the enclosed self-addressed envelope.

I hereby give permission for my child_____to participate in the research study of preschool language conducted by Daphne S. Fox, Teachers College, Columbia University, at the Lexington School for the Deaf in the following situations:

1. Observations and evaluations in the preschool setting.
2. Examination of school records for medical information.
3. A home visit.

Child_____

Parent's signature_____

Date of signing_____

Daphne S. Fox